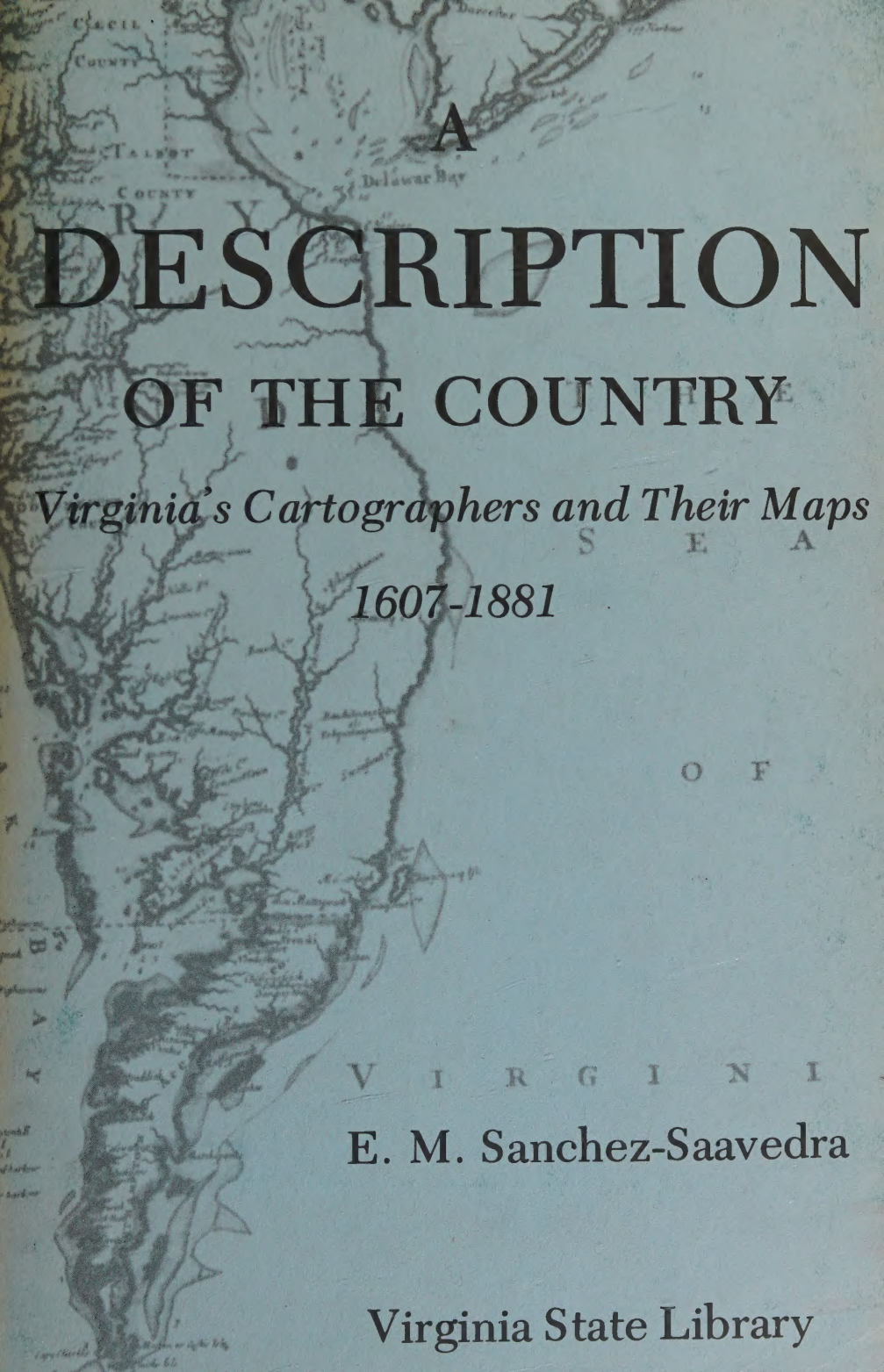




A DESCRIPTION OF THE COUNTRY

Virginia's Cartographers and Their Maps
1607-1881

V I R G I N I A

E. M. Sanchez-Saavedra

Virginia State Library

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Richmond
1975

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Standard Book Number: 0-88490-001-0
Library of Congress Catalog Card Number: 75-620073
The Virginia State Library, Richmond, Virginia
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PREFACE

There is a peculiar fascination in antique maps that cannot be matched by modern ones. In an age of satellite weather photographs and high-speed color printing presses, early hand-crafted maps provide a refreshing glimpse into a less frantic way of life. Often ludicrous in their misconceptions and distortions of geography, pre-industrial maps nevertheless have a beauty and dignity of their own, enhanced by the fact that their creators intended them to be useful tools besides.

This portfolio is not intended to be a collection of cartographic museum pieces for decorative purposes; rather it attempts to show the evolutionary development of a vital branch of science. Emphasis has been placed on the human beings whose explorations, personal sacrifices, and artistic talents are reflected in their maps. Each map influenced and was influenced by many other maps, some of which are discussed in this publication. Before the passage of international copyright laws plagiarism was an accepted procedure in the diffusion of cartographic works. In most instances, the facsimiles herein are "landmark" maps, the originals from which hundreds of other maps were copied. Only the second facsimile is a piracy, based on the famous 1673 Augustine Herrman map.

INTRODUCTION

If we consider Man as an inhabitant of the Earth, as a reasonable Being endued with curiosity, as a member of Society, and as Connected by Commerce, and the interchange of arts and manufactures, with the most distant nations, few studies can appear of such importance, or procure more rational, more useful entertainment, than that of Geography.

Joseph Collyer, *A New
System of Geography*, 1770.

On November 10, 1766, John Henry, of Hanover County, petitioned the Virginia House of Burgesses to help him finance the publication of a new map of the colony. The best map of Virginia then in existence had been engraved nearly twenty years earlier and it showed no county boundary lines. Only a few of the frontier forts and none of the settlements made during the French and Indian War had been mapped adequately. Hundreds of homesteaders were in effect beyond the reach of colonial government. As a loyal Virginian, Henry wanted his colony to lead the others in commerce and political stability. His petition stressed the need for an accurate map as a decided benefit "to the honour of the Colony, as well as to the interest of Great Britain, by the more speedy settlement of the late acquisitions upon this continent."

Although the shortsighted burgesses, distracted by a depleted postwar treasury, rejected his petition, John Henry refused to abandon his scheme. In 1770, "A New and Accurate Map of Virginia, Wherein most of the Counties are laid down from Actual Surveys," was engraved by Thomas Jefferys in London. The map, also containing "A Concise Account of

the Number of Inhabitants, the Trade, Soil and Produce of that Province,” had been surveyed, drawn, and published at Henry’s personal expense. Because he received no financial assistance and was forced to economize, his map failed to reach the high standards he had set forth in his original petition. Nevertheless, it was attractive and sold well enough to ensure a small income for him and for his son Patrick.

Like John Henry, the explorers and mapmakers who created the originals of the maps reproduced in this publication had specific objectives in view. They hoped to promote settlement and economic development. Each of the maps has a story to tell, and this pamphlet has been designed to help the reader appreciate the background and the rendering of each specimen.

The maps in the portfolio are representative of major developments both in cartography and in Virginia’s and America’s history. Each has served as a tool, a document, and a work of art. The first two—John Smith’s map of 1612 and John Senex’s 1719 revision of a 1673 map by Augustine Herrman—belong to the period of exploration and first settlement in North America. Though crude by modern standards, they helped to inspire three generations of adventurers to leave Europe and face the uncertainties of a remote land. Both were repeatedly pirated by mapsellers.

Facsimiles 3 and 4—the Fry-Jefferson map of 1775 and a French nautical chart of the Chesapeake Bay in 1778—show Virginia as a firmly established colony with roads, towns, plantations, and seats of local government.

The fifth map—Thomas Kitchin’s view of the new United States in 1783—shows Virginia’s geographical and political relationship to the rest of the republic. It is one of the last maps to depict the state’s old colonial boundaries as they had been established under seventeenth-century charters, before they were reduced by cession and civil war.

Facsimiles 6 and 7—Hermann Böye’s 1827-1859 “nine-

sheet” map and Claudius Crozet’s 1848 internal improvements map—represent man’s attempts to bend geography to his will. In these maps, natural topography begins to take a subordinate role to political boundaries and transportation facilities. The open spaces and isolated plantations of the Fry-Jefferson map have given way to the canal and road builders.

The eighth facsimile—Captain Peter S. Michie’s manuscript survey of Richmond in 1865—is the most technically perfect specimen in the portfolio.

Map 9—William Barton Rogers’s geological survey of 1835—is a “special purpose” tool. Topography, internal improvements, and political boundaries in it became reference points indicating the locations of Virginia’s rock formations and mineral beds.

The cartographic trend from the late decades of the nineteenth century to the present time has been from general maps to specific ones covering small areas in minute detail. An overall Virginia state map constructed to a scale of eight inches to the mile cannot be drawn on a single sheet. Within the last eighty years cartographers have produced nearly perfect maps by dividing large areas into small manageable sections. The famous topographical “quadrangles” of the United States Geological Survey are some of the most accurate maps that have ever been drawn.

A portfolio of this scope can do little more than provide a cursory introduction to a richly documented and fascinating subject.

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Portrait of John Smith

CHAPTER 1

“DISCOVERED AT GREAT PERILL AND PAINE”

John Smith's Map of Virginia, 1607

These observations are all I have for the expences of a thousand pound, and the losse of eighteen yeers of time, besides all the travels, dangers, miseries & incumbrances for my countries good, I have endured gratis.

Captain John Smith, 1624.

In the cool stillness of a September night in the year 1609, a heavy barge lay at anchor in Chesapeake Bay, manned by a slumbering group of English explorers. Without warning, the tranquility of the night was shattered by a brilliant flash, and a screaming figure tumbled over the side into the dark water.

After his companions pulled the injured man from the bay, half drowned and incoherent from shock and pain, they carried him to the shore, where the removal of his charred clothing revealed a seared area covering his “body and thighs, nine or ten inches square in a most pitifull manner.” After dressing the burn with materials at hand, they placed him in the boat, made him as comfortable as possible, and rowed back to the tiny fort at Jamestown.

The unfortunate victim whose powder bag had suddenly exploded in the night was none other than Captain John Smith (1580-1631), Virginia's pioneer explorer and cartographer. Despite the seriousness of his burn, the rough and ready adventurer—who was not yet thirty years old—was deterred

only temporarily from his pursuit of a career that already included shipwreck, slavery, and combat in the Turkish wars.

The lack of surgeons in the colony forced Smith's return to England, but Virginia's loss was history's gain, for his enforced convalescence enabled him to arrange his notes, sketches, and diaries into publishable form. A map of Virginia (Facsimile 1), with an accompanying report, was one of the earliest products of the scientific and literary career that brought Smith a lasting place in history. In 1612, his second published work was issued by the new Oxford University Press. It bore the cumbersome title *A Map of Virginia with a Description of the Countrey, the Commodities, People, Government and Religion. Written by Captaine Smith, sometimes Governour of the Countrey*. This short promotional booklet included a fold-out copy of the first "state" of John Smith's map, printed from a copperplate cut by William Hole.

In a later age, Smith might well have been called a jingoist of sorts—nearly all his published books stress colonization as the only means by which England could challenge Spanish power. His views were often at variance with royal policy, which was heavily influenced by European ambassadors, but Smith doggedly published tract after tract extolling Virginia as England's greatest asset.

The only previously published English map showing land within the present-day boundaries of Virginia had been drawn by John White (or With), an artist who was a member of Sir Walter Raleigh's ill-fated Roanoke expeditions in the 1580s. White's elaborate map is essentially a view of what is now the Carolinas: only a small part of the Chesapeake Bay (Chesepiooc Sinus) region appears on his map.

Other English mariners who visited the middle Atlantic seaboard between 1590 and 1607 may have made sketch maps of the area, but none have survived. In 1606 the Virginia Company of London received a royal charter "to deduce a

colonie” north of the Carolina capes, to search for a “north-west passage” to the East Indies, and to explore and map whatever strange regions were accessible. Among the soldiers and seamen chosen to lead the expedition were captains Bartholomew Gosnold and Christopher Newport, both of whom had visited Virginia on previous voyages, and Captain John Smith, a resourceful explorer and mapmaker and a shrewd manager of men and events.

In April 1607, after a fourteen-week voyage across the Atlantic, Newport’s tiny flotilla of three ships sighted the Virginia capes that form the entrance to the Chesapeake. For reasons of safety and expedience, the small ships sailed up

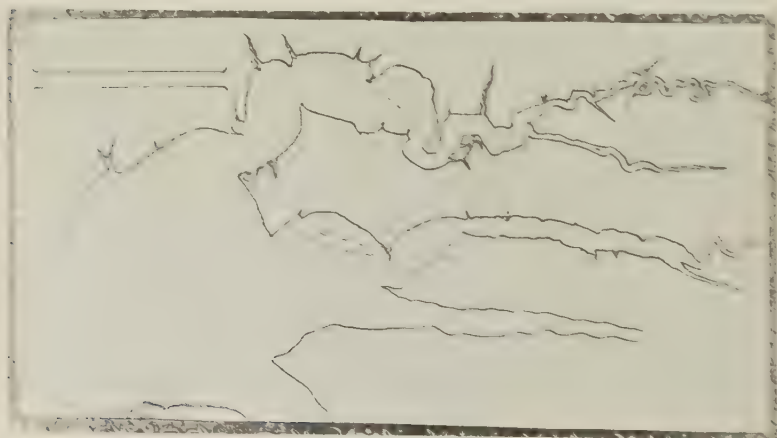


“Part of America, now called Virginia, first discovered by the Englishmen”

This map by John White, first published in 1590, was one of the first to show a portion of modern Virginia in detail. Copies of it were used by the 1607 expedition to guide them into the Chesapeake, part of which appears at center right.

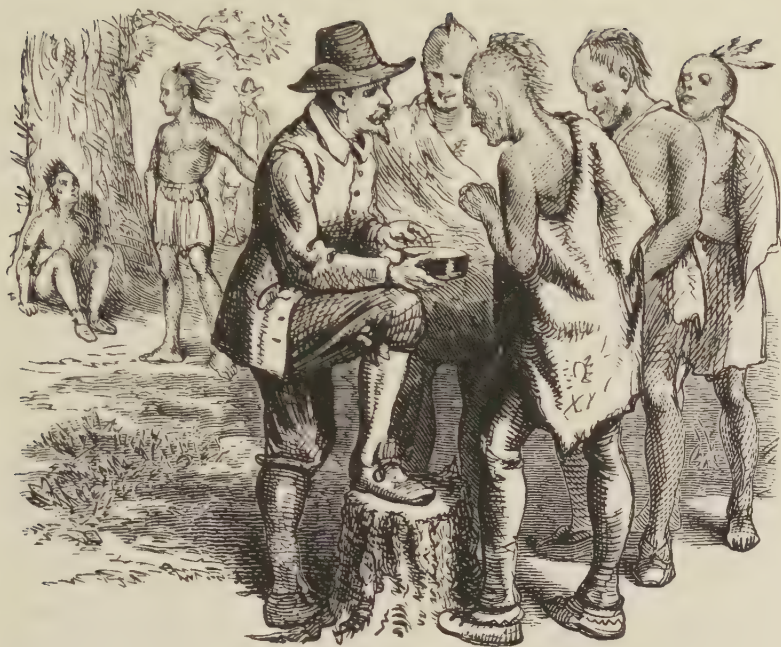
the newly christened James River about forty miles until they reached an island which seemed to offer a measure of protection. While a palisaded fort was "contrived" at Jamestown Island, Christopher Newport, John Smith, and a small party of "gentlemen" and sailors set out to explore the James River. Although the company's patent assured England's claim to North America from ocean to ocean, no English foothold had been established before 1607 and the claim existed only on paper. The journey up the river both strengthened the claim and provided Smith with important data for his future map.

Among the members of Newport's exploring party was Robert Tindall, a skilled mathematician and surveyor who held the post of gunner to the Prince of Wales. On the initial reconnaissance of the James River, he prepared his own surveys and later sent several curious sketch maps to England. The Tindall map of 1608 (which bears an uncanny resemblance to a diagram of the human intestinal tract) also reflects infor-



"The Draughte by Robarte Tindall of Virginia. Anno 1608"

Tindall, a member of John Smith's exploring party, drew this crude chart of Virginia's principal waterways. If the map is turned counterclockwise so that the scale of miles points diagonally to the lower right, north will be at the top.



While exploring the Chickahominy River, Smith was taken captive by the Indians. To prolong his life, Smith gave the chief "a round Ivory double Compass," which astounded the natives. This nineteenth-century woodcut purports to show Smith explaining global geography to his captors.

mation gathered on a later journey up the Chesapeake and shows portions of the Appomattox, York, and Rappahannock rivers, as well as the James from its mouth to a point west of the falls at present-day Richmond.

Smith's first reconnaissance had succeeded in obtaining valuable topographic information and in making contact with the Indians; a second expedition to the other rivers strengthened these advantages and further increased European knowledge of North America. Smith, who was undoubtedly eager to go adventuring again, set out a third time on June 2, 1608, with

thirteen others in "an open Barge neare three tons burthen" for a full-scale exploration of the Chesapeake. In spite of Indian harassment and natural obstacles, John Smith was able to survey large portions of the country by taking compass bearings from the barge.

When the party returned to Jamestown in early September, Smith had mapped the coasts and rivers on both sides of the bay from Cape Henry to the mouth of the Susquehanna River and had recorded Indian stories of mountains, gold mines, and great lakes to the west. Though they had found no northwest passage, Smith and his men had observed some unknown plants and animals, as well as some native customs.

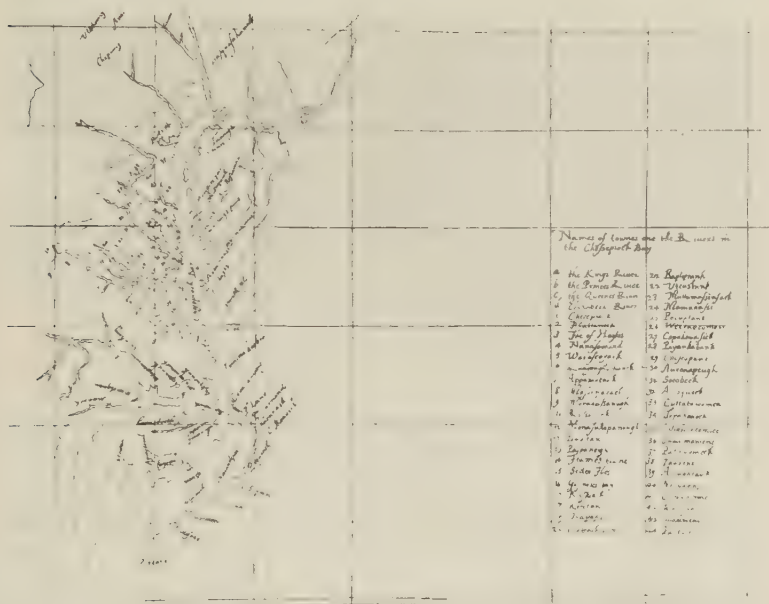
In November 1608, when Christopher Newport sailed for England to collect supplies, he took with him samples of native products, John Smith's "Relation" (or report) of Virginia, and two manuscript maps drawn by Smith to accompany his report. The *True Relation* was printed in 1609, but it did not include the maps. By this time, in spite of powerful and unscrupulous rivals, Smith had succeeded to the presidency of the Virginia Council and both his *Relation* and his maps carried the weight of authority. None of the manuscripts are extant, but both the maps and the report were printed and circulated in sufficient quantities to preserve them for future generations.

Smith's exploration of Virginia did not end at this point, however. He traveled the Pamunkey, Mattaponi, and Nansemond rivers as well as the Chesapeake Bay until the gunpowder explosion in 1609 necessitated his return to England for medical treatment.

At least one of Smith's manuscript maps returned to the New World in 1609, aboard a Dutch vessel commanded by Henry Hudson. A contemporary account of the voyage of the *Half Moon* mentions that Hudson carried "letters and maps which one Captain Smith had sent him from Virginia." These

manuscripts were lost on Hudson's second voyage to the New World in 1611 when he perished on the bay that now bears his name.

Although the public never saw Smith's original cartographic work, the published version and the many adaptations that appeared during the next one hundred years became well known to generations of merchants, geographers, and students. The



A section of the stolen map of North America in the Simancas Archives, Spain

In 1610 James I sent a surveyor (possibly Robert Tindall) to America to prepare a map of all lands in which the English were interested. The anonymous surveyor, basing his work on charts made by Smith, Hudson, Gosnold, and others, produced a large chart in four sheets, showing the Atlantic coast from Cape Fear to Labrador. Don Alonso de Velasco, the Spanish ambassador, stole the map and sent it to Philip II in 1611. Because it remained hidden in the Spanish archives at Simancas, the map had no influence upon English exploration, but it illustrates the fairly clear ideas of North American geography that existed as early as 1610.

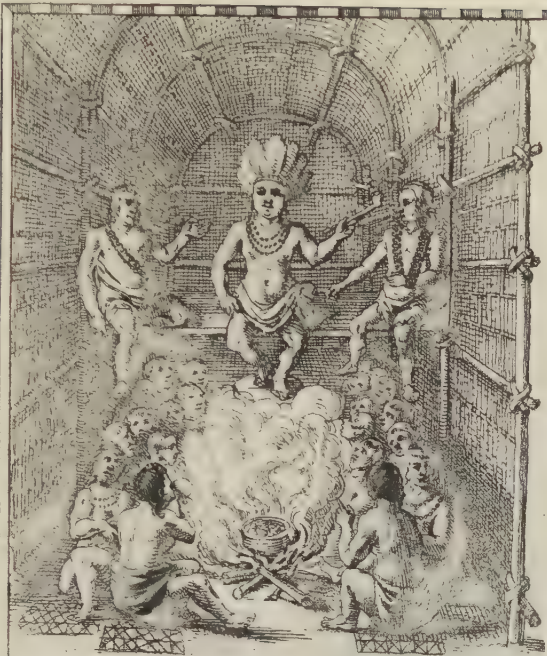


The Nova Virginiae Tabula of Peter Kaerius, ca. 1632

Once John Smith's map of Virginia was accepted as the basic source for the geography of the first permanent English colony in North America, engravers and map sellers throughout Europe pirated the work freely. Some of the unauthorized versions were nearly exact copies in terms of size, detail, and decoration. The Kaerius map is typical of the average adaptation in its lacking the crispness and accuracy of the original. Until the copperplate wore out in the mid eighteenth century, the Kaerius map remained in print.

map, accompanied by an explanatory pamphlet that Smith expanded from his original *Relation*, was first published in 1612, following his long convalescence. It was engraved on a copper plate for printing by William Hole, a young portrait engraver and die-sinker at the royal mint who had engraved several other maps earlier in his career.

Compared with some of the wildly fanciful maps of the same period, Smith's *Virginia* is remarkable for its accuracy and design. If the viewer looks at it as a serious attempt to describe an unknown land in terms recognizable to seven-



Status Regis Powhatan
*quando prefectus Smith Captivus
 illi daretur.*

Detail of a Dutch edition of John Smith's map, ca. 1642

Because most educated Europeans of the seventeenth century read Latin, most important maps and documents were published in the language of the Romans. Early explorers of America had an aversion to describing the native population with objectivity, preferring to elevate tribal chieftains to the status of emperors and kings. Smith's original caption for this scene read "Powhatan held this state and fashion when Capt. Smith was delivered to him prisoner 1607." The Dutch engraver altered this to "King Powhatan held this state when Prefect Smith was brought to him a captive."

teenth-century Englishmen, its air of quaintness, so distracting to twentieth-century students, disappears. Valid conventional symbols of one era often lose their meanings for people of another. Topographical drafting techniques have been partic-

ularly subject to change. The work of John Smith and William Hole reflects the conventions of both the Middle Ages and the Renaissance. If the modern viewer looks beyond the outdated symbols, he will discover that the Smith map is an amazingly accurate depiction of Virginia coastlines, watercourses, and landmarks. There is even a rough indication of highlands and lowlands.



The John and Virginia Farrer map of Virginia, 1651

One of the most ludicrous and well-meaning efforts to spur English colonization in America was the publication of this map by John Farrer, a member of the Virginia Company of London. Because the Indians interviewed by John Smith had spoken of mountains to the west (the Blue Ridge) and the California Indians had told Francis Drake of mountains to the east (the Sierra Nevada and Rockies), Farrer inferred that America was only about three hundred miles from ocean to ocean. The hopelessly snarled geography, the crude depictions of flora and fauna, and the surprisingly accurate notes about English, Swedish, and Dutch plantations illustrate the curious misconceptions and garbled popular knowledge of the New World.



The Homann map of Virginia, 1759 (detail)

The eighteenth century was both the apex and the nadir of ornamental cartography. While scientists like Edmund Halley, John Harrison, and David Rittenhouse were developing new and accurate ways of determining longitude and improving the accuracy of surveys, many “geographers” continued to reissue maps of the past century. Johann Baptistus Homann of Nürnberg, an accomplished engraver, issued a number of atlases in his lifetime. After his death and until the 1760s, his heirs at law continued to publish the old Homann maps. Although the Virginia plate is geographically worthless, it is significant as the last important map based on John Smith’s chart of 1608. The elaborately engraved title cartouche contains an odd combination of John White’s Indian drawings and later motifs.

The first edition carried no indication of latitude or longitude and lacked several other important geographic details. Between 1612 and 1625 the copper plate was revised by Smith and others, thus producing ten separate "states" of the map. The fourth "state," which was the first to include degrees of latitude and longitude, markedly increased its usefulness to navigators.

Like many maps of the period, Smith's work is highly decorative and aesthetically pleasing. Its artistic embellishment is functional as well, since the pictorial insets cover gaps in Smith's geographical knowledge. Perhaps the most outstanding and modern feature of the map is the forthright distinction made between those areas based on Smith's personal observation and those derived from hearsay accounts from the Indians. Smith, a true man of the Renaissance, was aware of the difference between legend and reality, and he was serious enough in his scientific observations to indicate—with a row of Maltese crosses on his map—the limits of his exploration. By stating that "to the crosses hath bin discover'd what beyond is by relation," he elevated his work well above that of many contemporaries, who placed mythical lands and waters at random throughout their creations.

Today most seventeenth-century maps are treasured for their decoration rather than for their geography, but Smith's map stands apart as a relatively scientific document. (As late as 1873 it was used as a primary source in the Virginia-Maryland boundary dispute.) At first glance, the viewer may see only a strange land adorned with lumpy hills, queer trees, sea monsters, Powhatan's council, and a "gyant" Susquehannock amazon; but if he will rotate the map a quarter turn counterclockwise, he can recognize the familiar Virginia coastline.

The modern reader, accustomed to thinking of north as up and south as down, may wonder why Smith drew his map sideways. Prior to the eighteenth century, maps were custo-

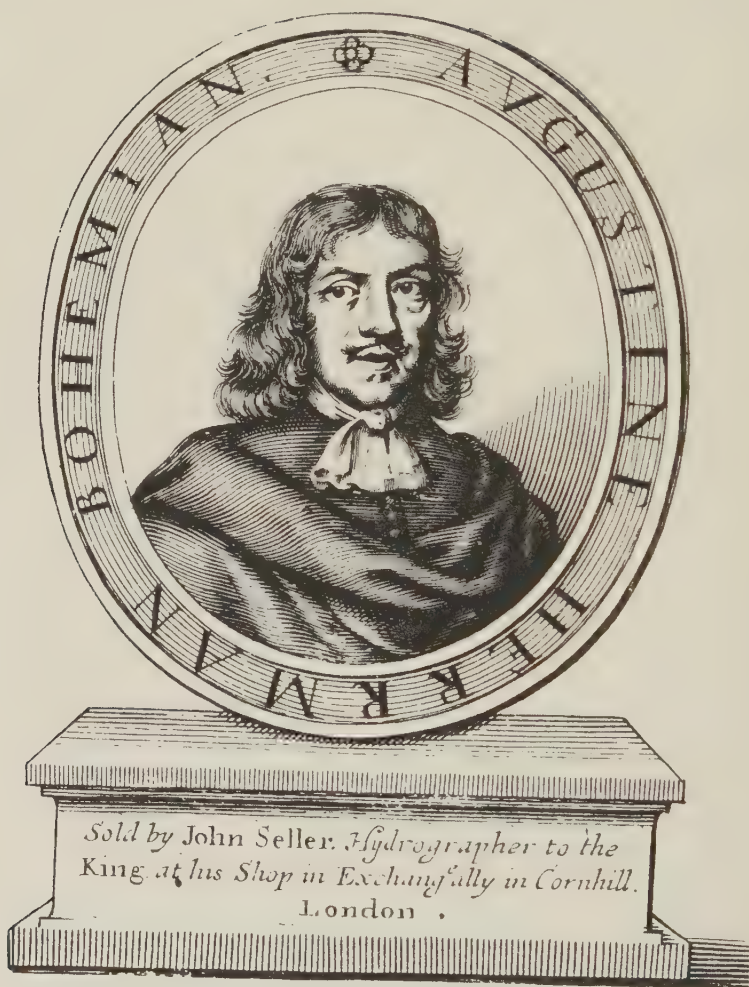
marily drawn from the point of view of a sailor approaching land from the sea. To a sailor reaching Virginia from the Atlantic, Smith's map was perfectly intelligible. The contemporary geographers and atlas publishers who freely adapted the original map saw nothing out of the ordinary in the fact that west was at the top.

Smith's map was perhaps the most influential piece of cartography in Virginia history. For the first three-quarters of the seventeenth century, the topography of Virginia was known to the outside world only through maps based on Smith's work. The changes made on Smith's map by others usually reflected the whims of individual copyists more than the findings of experienced surveyors. Even after fifty years of European settlement, Smith's old Indian villages continued to be perpetuated in maps. It remained for a Bohemian merchant, Augustine Herrman, to map the settled area between New Jersey and North Carolina in minute detail.

**DISTINCTIVE IDENTIFYING FEATURES OF THE
VARIOUS STATES OF THE JOHN SMITH
MAP OF VIRGINIA:**

- 1st state—No "1606" date under scale.
- 2nd state—Has "1606" date under scale, but no Smith arms.
- 3rd state—Has Smith's arms, but no motto.
- 4th state—Has motto under Smith's arms, but no "Winstons Isles."
Degrees of latitude and longitude were added for the first time.
- 5th state—Has "Winstons Isles," but no "Sparkes Content" or "Sparkes Valley."
- 6th state—Has "Sparkes Content," but no Purchas page numbers.
- 8th state—"Sparkes Valley" has replaced "Sparkets Content," but no "Downes dale."
- 9th state—Has "Downes dale" with Purchas page numbers "1692, 1693."
- 10th state—Has Purchas page numbers "1690, 1691."

(Note the marked bend in the Potomac River, which is a test for determining how far atlas makers incorporated the features of Smith's map.)



Augustine Herrman—a self-portrait

The engraved edition of Herrman's "Virginia and Maryland" included this flattering portrait of the cartographer.

CHAPTER 2

MARKING CHARTERED BOUNDARIES

Maps by Augustine Herrman and John Senex, 1670-1719

. . . And in this way [we] proceeded to the boundaries, when [Mr. Philip Calvert] said that the Maryland patent . . . expressly stipulated that they should extend into New England, whereupon we inquired . . . where would New Netherland be in that case? . . .

. . . After dinner [we] talked about his charts or maps of the country, of which he laid on the table two that were engraved and one in manuscript. . . . All differed one from the other. He wished to prove from them the extent of Lord Balthamoer's boundaries. . . .

Augustine Herrman, *Journal of the Dutch Embassy to Maryland*, 1659.

The map which superseded John Smith's was prepared by a successful businessman and political leader who turned to cartography fairly late in life. Augustine Herrman was born in the Bohemian city of Prague, in present-day Czechoslovakia, about 1605. He may have had some instruction in drawing from his neighbor Wenceslas Hollar, an artist and engraver, but apparently he had no other formal artistic training. When he was in his early twenties, Augustine entered the service of the Dutch West India Company as a merchant's factor, or representative, and was a principal leader in establishing the Virginia-Netherlands tobacco trade. By 1647, after years of traveling between New Netherland and the Chesapeake colo-

nies, he had made his home in New Amsterdam and had struck out on his own as a dealer in tobacco and such other kinds of merchandise as he found profitable. Though most wealthy men in the Dutch colony resided outside the city at their country estates, Herrman remained in urban New Amsterdam close to his counting house.

Although Herrman wished to be remembered as the founder of the Virginia-Netherlands tobacco trade and as a political leader of some stature in New Netherland, he won his principal place in history as the author of the most accurate seventeenth-century map made of the Middle Atlantic colonies. When the Anglo-Dutch wars of the 1650s disrupted colonial and national commerce between the Low Countries and England, the tyrannical governor of New Amsterdam, Peter Stuyvesant, attempted to usurp the authority that the Netherlands Staats-General had formerly exercised over its American colony. To assist him in governing during the emergency, he created a nine-man council of merchants and landowners, whose ordinary peacetime affairs had come to a standstill.

One of the leading members of the body was Augustine Herrman. Because the repeated wars had virtually destroyed his trading ventures, Herrman devoted his enforced leisure time to politics. He opposed the governor's play for power, won a more significant role for the council, and even gained Stuyvesant's grudging respect.

It was, in fact, Stuyvesant who unwittingly launched Herrman on the third phase of his career. The former merchant turned to cartography after Stuyvesant appointed him New Netherland's special ambassador for the improvement of Anglo-Dutch relations. Between 1652 and 1659 Herrman traveled frequently from New Amsterdam to the adjacent English colonies. Unfortunately, Herrman's official missions were not especially successful in resolving boundary disputes or in winning political and economic security for New Amsterdam.

But his last “embassy,” a trip to Maryland in the fall of 1659, bore fruit of a different species. It resulted in a new life for Herrman and a milestone in American cartography.

Herrman, disenchanted with Stuyvesant’s harsh rule and impressed by the rolling countryside and mild political climate of the Chesapeake area, decided to move to Maryland. Fifty-five was not an ideal age at which to begin a new life, but even the lack of money to purchase an estate did not hinder him. Herrman wrote to Cecil Calvert, second Lord Baltimore, in England requesting permission to settle within the Maryland proprietor’s domains and offering the Catholic nobleman a novel proposition. In return for a sufficient grant of land, he would construct an accurate map of Maryland and the neighboring colonies.

Baltimore liked Herrman’s suggestion. He had unspoiled land in abundance and was sorely in need of a good map. Endless boundary disputes with the Dutch, Swedes, and Virginians made a reliable, up-to-date survey of the Middle Atlantic colonies and the Chesapeake Bay a political necessity, and such a document would be of assistance in planning the further development of Maryland. It could also prove the extent of his holdings, as they stood in the 1660s, in any future boundary clashes with neighboring colonies. Baltimore advised Herrman to proceed immediately with the project, and by 1660 the amateur cartographer was already at work. In the same year Baltimore made Herrman a naturalized citizen of the Maryland palatinate.

During the next decade, Herrman constructed a map of the East Coast from the Jerseys to Carolina. Using the best existing maps, most of them based on the survey by John Smith, he made a base map of the region. Although second-hand data—often erroneous and usually contradictory—was of only limited value, it provided, at least, the basic contours for his map. Herrman realized that the information he had at hand should

be verified, corrected, and brought up-to-date, and his awareness of this need placed him in the ranks of scientific map-makers, as opposed to the "geographers" who remained content to copy earlier maps as they stood. Herrman traveled constantly from one colony to another, talking with local surveyors and visiting land offices and county courthouses to look at maps and plat books. He also surveyed many of the settled regions himself to check the accuracy of the second-hand information he had gathered. After spending ten years and two hundred pounds of his own money, he found his labor well



"One of the finest examples of seventeenth-century mapmaking"—

William Faithorne's engraving of the Herrman map

Printed on four sheets, the Herrman map supplanted John Smith's "Virginia" as the standard map of the Middle Colonies. It was the first map of the Chesapeake Bay to include depth soundings.

rewarded. He produced a map that was amazingly accurate for its day, and it won him a twenty-thousand-acre tract of land from his satisfied patron.

The first printed version of the map appeared in 1673 bearing an oval-framed portrait of the cartographer and a note that the land was "Surveyed and Exactly Drawne by the only Labour and Endeavour of Augustin Herrman, Bohemiensis." The engraving was the result of three years of work by William Faithorne (1616-1691), England's finest contemporary master of the art. In technique and design, the Herrman-Faithorne map was unsurpassed in the seventeenth century. Tastefully embellished with an ornamental title, coats-of-arms, notes, compass roses, and a scale, it is one of the finest early maps of middle North America. But like many another artist past and present, Herrman was dissatisfied with the finished work, and claimed that his original concept "was slobbered over by the engraver Faithorne defiling the prints by many errors." If Herrman was right, his original manuscript must have been magnificent.

The Bohemian obtained a fourteen-year "Royall License and Particular Priviledge" (the nearest equivalent to a copy-right) on the printed version. It seems likely that Baltimore had the map printed for only limited circulation. Too expensive to serve the needs of the average merchant or seaman, the big, beautifully engraved map was more suitable for the sumptuous cabinet atlases of noblemen than for hard practical use on the quarterdeck.

A small number of these printed copies were available by 1674 at one of the three London shops of John Seller, the royal hydrographer. Seller advertised them in the *London Gazette* as "a new map of Virginia and Maryland in four sheets describing the Countries and the situation of the Plantations in the said Countreys, with the Rivers, Creeks, Bayes, Roads and Harbors on the sea-coasts."

Advertisement.

THERE is now Engraving, and will speedily be Publish'd, *A New Pair of GLOBES*, sixteen Inches Diameter; the *Terrestrial* has on it all the New Discoveries that have been lately made, together with an useful View of the General and Coasting Trade-Winds, Moonsoons, &c. The *Cælestial* has the Stars laid down from the Correctest Tables of the best Astronomers of our Age, with eighteen Constellations never Engraven upon any Globe.

All those Gentlemen that are willing to Furnish themselves with them, are desired speedily to inform the Undertakers *J. Senex* and *C. Price*, next the *Fleece-Tavern* in *Cornhill*; They intending to fit up no more than what are Subscrib'd for.

In 1708 John Senex engraved plates for printing a matched pair of globes devised by Charles Price, an English hydrographer. Senex's experience in constructing global projections influenced his other mapmaking activities.

Despite the "Royall License," Herrman's map—like the Smith map before it—was pirated freely by many English and European publishers who recognized a fine piece of work and wanted a version that would sell in large quantities. The Lord



George Hamilton, Earl of Orkney, by Jacobus Houbraken, ca. 1750

The Earl of Orkney served as Virginia's royal governor from 1710 to 1737. He never visited his province but administered it through deputies Alexander Spotswood, Hugh Drysdale, and William Gooch, three of the colony's ablest leaders. In 1719 John Senex dedicated his map of Virginia to the earl.

Proprietor made few if any attempts to curb the publication of pirated maps, perhaps because Herrman in his zeal to please his patron had stretched the Maryland boundaries to include extensive territory in Delaware and in what was to become Pennsylvania.

Of the many unauthorized adaptations made from Herrman's

surveys, perhaps the best is the one prepared a third of a century later (Facsimile 2) by John Senex (?-1740), a well-known London mathematician and geographer. While Herrman had been a practical and talented amateur who drew his map from personal observations and rough surveying techniques, Senex was a professional geographer and globemaker who remained in London and did not go adventuring in America. He was in the business of revising old maps and publishing and selling his new versions. He often dedicated an edition to one of his wealthy patrons, a common practice in an age dominated by the enlightened nobility. About 1719 he issued a new and modern version of Herrman's 1673 map and dedicated it to the influential Lord George Hamilton, Earl of Orkney, who had been appointed governor of Virginia in 1710. Motivated by the same spirit of flattery that had led Herrman to distort Maryland's boundaries, Senex emphasized Virginia's jurisdiction.

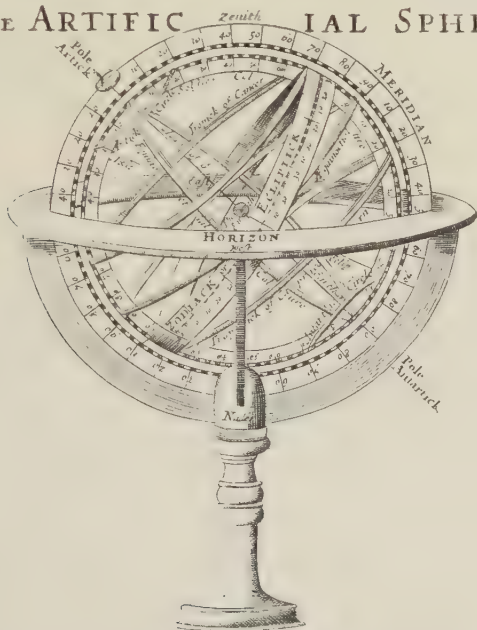
Though he did not himself visit the New World, Senex must have had access to various colonial reports that were kept in the offices of the Board of Trade in London, for his map includes a number of political changes that had occurred after 1673. His edition showed most of the early eighteenth-century settlements, counties, and boundaries that had come into being since the appearance of Herrman's map. Senex omitted some geographical details in the western limits, but in most respects he followed the topographical lines of Herrman's work.

The most readily noticeable change was in the orientation of the map. John Senex's major contribution to geography had been a pair of celestial and terrestrial globes, constructed in 1708. As a globemaker, Senex was accustomed to think of north as up. Model globes, first introduced into England during the reign of Queen Elizabeth I, had become the basis for extensive research into spherical geometry and navigation. As

globes increased in popularity among merchants and seamen, the earlier convention of orienting maps according to sailing directions became obsolete. Herrman, working in the 1660s, had placed west at the top of his map, just as had John Smith. Senex turned the Herrman map counterclockwise to make it conform to newer concepts. Quite naturally, Senex's map has a more familiar look to modern viewers.

Through the work of Smith, Herrman, and Senex, the essential groundwork for a knowledge of the terrain and settlements of eastern Virginia had been completed. Increasing numbers

THE ARTIFICIAL SPHERE



The "Artificial Sphere" was used widely in the construction of globes and in demonstrating geographical principles. The "Zodiack, or Ecliptick," indicates the $23\frac{1}{2}^{\circ}$ inclination of the earth's axis to the plane of its orbit around the sun. Lunar eclipses can occur only when the lunar orbit and the ecliptic coincide. The "Meridian" and its zenith represent the Sun's positions in relation to the horizon. The calibrations show degrees, minutes, and seconds of latitude and longitude. The horizon, meridian, and ecliptic bands are still used on modern terrestrial globes.

of explorers, seamen, merchants, planters, and settlers found uses for accurate maps of Virginia, and the Senex map had a practical advantage that Herrman's had not possessed. It was small enough to be tacked to the wall of a captain's cabin or carried in a saddlebag.

But, as more settlers came into the Old Dominion, the frontier moved farther west and settlements grew into towns and ports. The Senex map became outdated. In 1738, a former Oxford University professor of mathematics by the name of Joshua Fry petitioned the Virginia House of Burgesses for financial aid to prepare a new survey. His petition—destined to be presented, ignored, and rejected several times during the next decade—finally resulted in the publication of the Fry-Jefferson map of 1751, the first important map of the colony to be prepared by Virginians.



CHAPTER 3

COLONIAL EXPANSION

The Joshua Fry–Peter Jefferson Map, 1751-1794

The President desired the Opinion of the Board what would be in their Judgement a sufficient and adequate Compensation to Joshua Fry and Peter Jefferson Gent. for their trouble in drawing a Map of the Inhabited part of Virginia. . . . The Board was of Opinion that each was deserving of One hundred and fifty pounds Sterling for his Trouble and Expence.

*Executive Journals of the Council
of Colonial Virginia,
October 15, 1751.*

In the early spring of 1751, a small party of men and pack animals moved slowly through the western forests of Albemarle County. After almost a year of constant riding, walking, and climbing, they were near home again, laden with surveying instruments, a sheaf of sketch maps, and several battered field books with stained covers.

The leaders of the expedition were English-born Joshua Fry (1700-1754), former professor of mathematics at Oxford University and at the College of William and Mary in Williamsburg, and his colleague Peter Jefferson (1708-1757). Their



The Fairfax Proprietary, or “Northern Neck”

This survey map, based on the work of William Mayo, was inadequate for conducting major land transactions. In 1747 Joshua Fry and Peter Jefferson made a new survey which established their reputations as cartographers.

association had begun nearly ten years earlier, when Fry left Williamsburg for the life of a backcountry planter in western Goochland County. In 1744, when Albemarle County was formed from Goochland, it included the land owned by Fry and his neighbor Peter Jefferson. The new county's first "commission of the peace," which provided for the establishment of local government, named Fry and Jefferson county justices. Fry simultaneously held the offices of presiding magistrate, county lieutenant, and county surveyor.

Unlike John Smith and Augustine Herrman, both Joshua Fry and Peter Jefferson were professional surveyors. Fry's background in mathematics was a factor in his appointment as a crown boundary commissioner to decide the true limits of the "Northern Neck," Virginia's only proprietary grant.¹ Commissioner Fry recommended that Peter Jefferson be hired as a surveyor on the project, and his two fellow commissioners agreed to the choice.

The Northern Neck survey was crucial to the stability of colonial Virginia, as friction often occurred over the separate land grants made by the Fairfax and Williamsburg land offices. The same piece of land might be paid for and claimed by two or more settlers, each with a lawfully drawn deed. William Mayo, a native of Wiltshire, England, with twenty years of surveying experience in Barbados and Virginia, had prepared the first map of the Northern Neck for Lord Fairfax in 1737.² Because of faulty instruments, Mayo had not been able to produce a survey as accurate as Fairfax desired. A sort of

1. In 1649 the exiled Charles II had granted nearly 5,000,000 acres in northern Virginia to his supporters. His successor, James II, regranted the area in 1688 to Thomas, Lord Culpeper. In 1745 royal courts vested the proprietary rights in Culpeper's heir, Thomas, Lord Fairfax. These rights included maintaining a separate land office.

2. Mayo is best remembered in Virginia as the surveyor who laid out the city of Richmond for William Byrd in 1737.

no-man's-land resulted from each erroneous angle on the map, and thousands of acres fell under dispute.

On April 22, 1747, the new survey by Fry and Jefferson was approved by the Council of State. Their successful completion of the project led to further appointments for the two men. In 1749 they were commissioned to extend the surveyed portion of the Virginia-North Carolina boundary westward from Peters Creek (in present-day Patrick County). Beginning at this point, where an earlier expedition under William Byrd had stopped, Fry and Jefferson's party pushed the survey more than ninety miles farther west across densely wooded, mountainous country until the extremely rough terrain forced them to end their work at Steep Rock Creek (in present-day Washington County).

While the crown commissioners and their assistants struggled to map Virginia's southern boundary, the first trickle of frontier settlers began to build cabins in some of the far northern and western reaches of the colony. Governing the western settlements from Williamsburg was nearly impossible. The orderly spread of English plantations, which had characterized the development of tidewater Virginia, became a haphazard migration of the poor, the malcontent, and a few outlaws. Many of the frontiersmen scorned both the inadequacy of the military protection afforded by the colony and the taxes that supported it. An almost general ignorance of frontier geography made attempts at orderly administration futile. Existing maps depicted only eastern Virginia; the west was almost as mysterious as China (and nearly as difficult to reach, according to chair-bound colonial administrators). Both Virginia and Pennsylvania claimed large areas in the Ohio River Valley, but neither colony had more than the vaguest notion of the real boundary line.

Important as the surveys of the Northern Neck and the North Carolina border were, they were to Fry and Jefferson

only pieces of a large project: the mapping of Virginia from the Eastern Shore to the Ohio River, including Maryland and parts of Pennsylvania and North Carolina. As a new resident and county officer of the western Piedmont, Joshua Fry had recognized the need for such a map as early as 1738. Before his association with Peter Jefferson, Fry, with his colleague Robert Brooke, a surveyor and “Knight of the Golden Horse-shoe,”³ had petitioned the House of Burgesses for monetary assistance to remap the colony. Their plan of “an exact survey of the inhabited part of Virginia, with all waterways, parishes, towns and whatever else is remarkable,” had been turned down four times by the colonial Assembly.

Finally, in 1750, the royal Board of Trade and Plantations saw the need for a better map than Augustine Herrman’s. The new interest in western lands by England and France, coupled with Virginia-Maryland-Pennsylvania squabbles over the claims of land development companies, revealed a serious lack of geographical knowledge. Virginia’s acting governor Lewis Burwell was ordered to appoint “the most proper and best qualified” surveyors to prepare the new map. Burwell appointed Joshua Fry and Peter Jefferson to carry out the task.

For two men and a handful of assistants to survey so extensive an area would be impractical today, even with highly advanced instruments. In the eighteenth century it was just about impossible. Conditions had improved somewhat since the days of John Smith and Augustine Herrman, but surveying techniques were still relatively primitive. Like Herrman, Joshua Fry and Peter Jefferson began their work by constructing a sketch map based on earlier sources. From personal observation they affirmed or corrected the latitude and longitude of certain key landmarks. Since they had previously surveyed

3. On the famous expedition of 1716, led by Alexander Spotswood to the Blue Ridge Mountains and Shenandoah River, each member was given a small golden horseshoe as a souvenir.



The cartouche of Fry and Jefferson's map

the northern and southern boundaries of Virginia, their own notebooks became a primary source of data on these areas.

In October 1751, a scant eight or ten months after receiving their commissions, the two surveyors submitted their manuscript map to the governor's Council. Fry and Jefferson had produced a map covering the colony from the Atlantic coast to the Ohio River. The eastern half was detailed and accurate, showing counties, plantations, seats of local government, and topographical data. The western half, as might be expected, revealed only a bare knowledge of the frontier. Lake Erie was placed several hundred miles too far south, and the Ohio River was constructed from hearsay and guesswork. Still, it was the only map then in existence showing the entire span of the colony's territory and it was superior to all earlier maps.

The map and a written topographical analysis were sent to England early in 1752 for study and publication by the Board of Trade. Foreseeing that a bit of flattery would do no harm, Fry and Jefferson “humbly inscribed” their map to George Montague Dunk, Earl of Halifax and First Lord Commissioner, and to “the rest of the Right Honourable and Honourable Commissioners, for Trade and Plantations.”

Thomas Jefferys, geographer to the Prince of Wales, was awarded a contract to engrave and publish the map. Jefferys in turn hired two of the best engravers in England to design the format and engrave the map in copper. Francis Hayman, who drew the elaborate title cartouche of a romanticized wharfside scene, probably assisted Jefferys in transferring the map to copperplates. Charles Grignion, a native of France, did the actual engraving. The joint work is one of the finest examples of eighteenth-century English cartography. Unlike many contemporary specimens of engraved maps, the Fry-Jefferson map is remarkably uncluttered and free from baroque embellishment. Its lines are fluid though meticulous in all details.

The first edition, printed from four plates, was not offered for sale until late 1754 or early 1755. By April 1755, when James Hunter advertised the map for sale in his *Williamsburg Virginia Gazette*, some copies had undoubtedly crossed the Atlantic. Joshua Fry never saw his work in print. On May 31, 1754, Colonel Fry accidentally fell from his horse at Wills Creek and died shortly afterward of internal injuries.

A year before his death, Joshua Fry had received new maps of the western frontier from his second in command in the 1st Virginia Regiment—Major George Washington. In 1753, Washington and Christopher Gist, a surveyor and scout, traveled as emissaries to the French outposts at Venango and Fort Le Boeuf, on the upper Allegheny River. (Gist’s surveys on this and earlier trips were to become the basis for most eighteenth-century maps of the Virginia-Pennsylvania fron-

tier.) Using Gist's notes, Fry and Jefferson prepared some major alterations for their map and sent them to London in time for a second edition, printed in 1755. Misplaced Lake Erie was removed entirely, and the true meandering lines of the Ohio replaced the hesitant squiggles marking its course on the first edition.

Gist's information was also used extensively by Lewis Evans (1700?-1756), who published his *Map of the Middle British Colonies* in Pennsylvania in 1755. Evans's map became the most influential guide to North American geography throughout the second half of the eighteenth century.⁴ In a volume entitled *Geographical, Historical, Political, Philosophical and Mechanical Essay's*, printed by his friend Benjamin Franklin, Evans discussed the sources for his map, which became the standard map of North America for more than thirty years. He acknowledged that "the greatest part of VIRGINIA is composed with the Assistance of Messieurs Fry and Jefferson's Map of it; and as this had the assistance of actual surveys . . . joined to the Experience of two skilful Persons, it would have been Affectation to have omitted the Advantage of it."

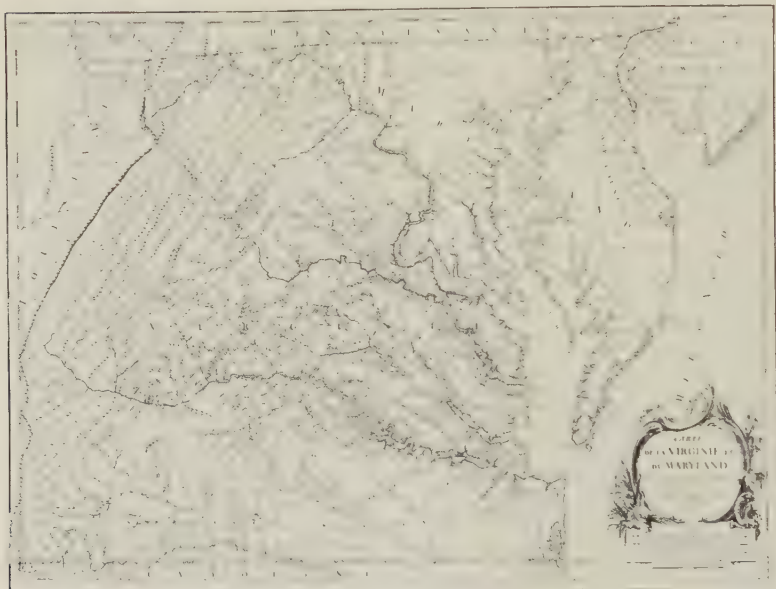
The French, who were as vitally interested in their American claims as the English were in theirs, lost no time in obtaining copies of the Fry-Jefferson and Lewis Evans maps to use in their military campaigns. In 1755-1756, Sieur Robert de Vaugondy, geographer to the king of France, published his great *Atlas Universel*. A close copy of the new map of Virginia, "dressée sur la grande carte angloise de Messieurs Josué Fry et Pierre Jefferson," was included as the final plate.

Three further English editions of the Fry-Jefferson map were published between 1761 and 1794. The first of these, which appeared toward the close of the French and Indian War, included more additions to western geography. The 1775 edi-

4. See Chapter 5.

tion (Facsimile 3) is significant because of its use during the American Revolution. The Vaugondy edition in French once again aided Gallic armies in America—this time as the allies of the former British colonists.

Peter Jefferson's son Thomas, who served as Virginia's war-



Vaugondy map of 1755

time governor, shared his father's love of maps and studied surveying briefly before entering upon his political career. In 1784-1785, while living in Paris, Jefferson wrote his classic *Notes on the State of Virginia*. As a supplement to the book, he prepared a revision of the Fry-Jefferson map, adding county boundaries and new geographical data, particularly for the western areas.

Thomas Jefferson's map, although intended as a new edition of his father's work, actually bore little resemblance to the four-

sheet map of thirty years before. Explorers, geographers, and naturalists had opened up the frontier and had charted the hitherto unknown rivers and mountain ranges. During his governorship, Jefferson had access to nearly all of these maps and reports and had made copies for his files. Although his father's notes had perished in the fire that destroyed their family home in 1770, the younger Jefferson later assembled



Thomas Jefferson's map of Virginia, 1784

As a supplement to his *Notes on the State of Virginia*, Thomas Jefferson drew "a Map of the Country between Albemarle Sound and Lake Erie," based largely on the older Fry-Jefferson map. Although not as decorative as its model, the 1784 map was far superior in its depictions of geography and political boundaries.

enough material to fill in most of the gaps on the Fry-Jefferson map.

Even after publication of Thomas Jefferson's map in 1787, the successors to Thomas Jefferys continued to publish the old Fry-Jefferson map in their bound atlases. The final edition appeared in 1794, issued by the firm of Laurie and Whittle. Aside from the new publisher's by-line, it was identical to the 1775 edition.

The Fry-Jefferson map—like the maps of John Smith and Augustine Herrman—was intended primarily to illustrate inland geography. Still needed was a navigational chart to guide ships of all classes into the Chesapeake Bay. Like the Fry-Jefferson map, the *Carte de la Baie de Chesapeake* of 1778, was to have military as well as peacetime uses and was to be an asset to both British and French fleets during the American Revolution.

CHAPTER 4

NAVIGATIONAL AIDS

A Chart of Chesapeake Bay, 1778

It is a general Complaint among Seamen, that few Sea Charts are found Correct; and this perhaps may be owing to the Manner of surveying the several Coasts, and copying from old Sea Charts.

John Hamilton Moore, Royal Navy,
The Practical Navigator, 1776.

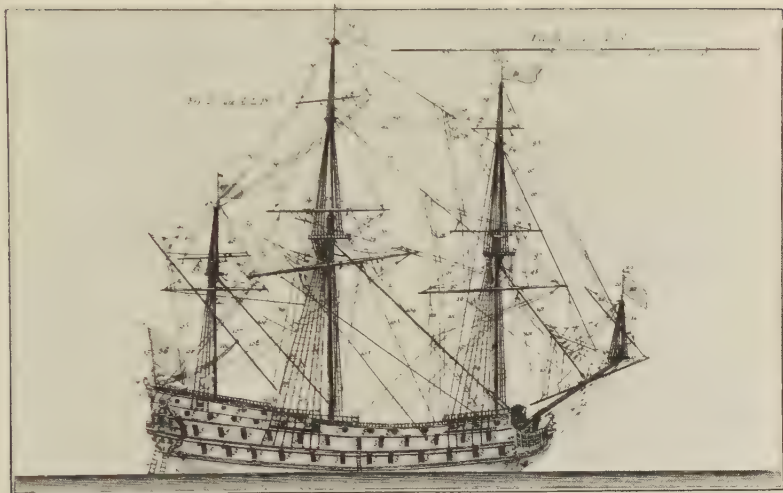
The first glow of sunlight had just appeared over the Atlantic Ocean off Cape Charles on August 2, 1750, when the merchantman *Berry*, two and a half months out of London, sailed past Cape Henry and made ready to enter Chesapeake Bay. Although a “fine, fresh gale” had just sprung up, the ship’s master, Captain Belcher, ordered all sails set and directed the steersman to keep a straight course. As the *Berry* scudded along, heading directly toward the dangerous shoal called Willoughby Point, a Chesapeake pilot came alongside and offered to guide her into the bay. But Belcher, “superior to all caution” and hoping to save a pilotage fee, ignored the proffered assistance. Despite his refusal, the pilot—who saw imminent danger—followed in the rear. When the ship’s bottom suddenly scraped sand in less than three fathoms of water, Belcher’s complacency vanished. In the “utmost terror and confusion” he began to implore aid from the previously scorned pilot and tried desperately to reverse the *Berry*’s course. Obviously enjoying the situation, the pilot cheerfully waved

his hat to the northward and the chastened captain contritely followed his directions.

Similar incidents, not all with such happy endings, were relatively common among sea captains who chose not to engage a competent pilot to guide them into the tricky waters of the Chesapeake Bay. In effect, a bay pilot served as a "human map." He had to be familiar with every foot of the coastlines in his area—a knowledge he developed through constant observation and practice. Though no map could possibly be so versatile as an experienced pilot, the scarcity of licensed Chesapeake pilots in the eighteenth century made sailing charts of one sort or another an absolute necessity.

Carte de la Baie de Chesapeake (Facsimile 4) is an example of the type of specialized map once used to guide merchantmen and warships into the Chesapeake. Depicting aquatic rather than topographic features, it was a forerunner of modern hydrographic charts. The 1778 "Carte" was not the first hydrographic chart of the Chesapeake; Augustine Herrman's map of 1673 was the earliest printed map to include depth soundings. A number of poorly drawn adaptations of the Herrman map were passed off as nautical charts from the 1680s through the late eighteenth century, but they had little or no value in actual navigation.

In an era when few parts of the world were adequately mapped, mariners resorted to the traditional method of borrowing existing charts and making their own tracings on oil-skin. By the end of a voyage, a typical navigator would have heavily revised and annotated his original tracing with observations, plotted courses, and corrected coastlines. For each succeeding voyage to the same area he would make a new set of tracings from his revised charts. These, in turn, would be marked up during the next cruise. Because few governments maintained hydrographic offices and map depots to



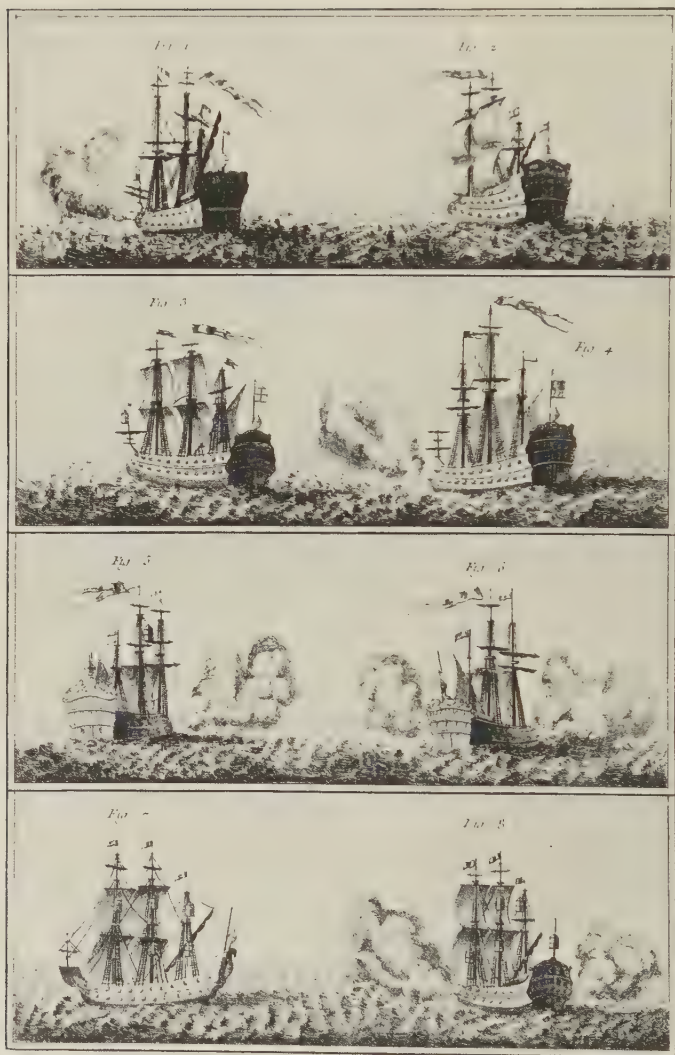
A French warship from Diderot's Encyclopedie

Typical of the armed vessels that entered the Chesapeake during the Revolutionary War, this three-masted square-rigged frigate was pictured in the famous encyclopedia published by Denis Diderot in 1768. Ships such as this carried supplies, munitions, and soldiers to Virginia from 1778 to 1783.

preserve the results of these voyages, most of the tracings and notes have been lost.

The advantages of personal chartmaking are obvious. Each navigator with faith in his own abilities was absolutely certain that his charts were correct, and he could use his own systems of shorthand and notation without worrying about posterity. The major disadvantages of such a system are equally clear. Until a mariner built up his own map collection, he had to repeat the work of others in sounding and charting familiar areas. The process wasted time and money, especially if his ship carried perishable cargo, and it could prove particularly dangerous in wartime.

In 1735, Captain Walter Hoxton, a veteran of twenty-three voyages to Virginia, decided to aid his fellow English navigators by publishing a massive and detailed chart of the Chesa-



Signaling at sea in the eighteenth century

Another plate from Diderot's encyclopedia shows two warships signaling during an engagement by using flags and pennants. In the battle between the British and French fleets off the Virginia capes, these signals were the only means of communication between the participating vessels.

peake, based on his own oilskin maps and logbooks. It included enough blank areas for a mariner to jot down personal observations, and it lent itself readily to hard usage (which is perhaps the reason for its present rarity).

Hoxton's practical seamanship was equaled by his talent for accurate scientific observation. His engraved chart carried a wealth of notes on the navigational problems he had encountered on his voyages. Its format and uncluttered design were greeted with "the sincerest form of flattery," and within a few years nearly every published map of the Chesapeake was based largely on the Hoxton chart. William Mount and Thomas Page, Hoxton's publishers, were quick to incorporate his data into the other charts and maritime atlases that they sold at their Tower Hill shop in London. By the 1750s, French geographers had begun to pirate the Hoxton chart for their own maps of the bay.

By the time of the American Revolution, Hoxton's "Mapp" was no longer accurate, for coastlines had eroded and shoals had silted over. Yet his work remained the most useful printed chart of the area until 1776, when Thomas Jefferys of London issued the first significant revision of the chart in *The North American Pilot*. The new version strongly resembled Hoxton's chart in size, format, and orientation, but there the similarity ended. Entitled "A New and Accurate Chart of the Bay of Chesapeake," it was largely the work of Anthony Smith, one of the best of the bay pilots in the years before the American Revolution. Smith had plied his trade in St. Marys County, Maryland, for about twenty-five years and had assisted officers of the Royal Navy in surveying the Potomac River sometime during or shortly after the French and Indian War.

In contrasting Walter Hoxton's 1735 chart with the "draughts" of Anthony Smith, one notices several major differences in the coastlines. Hoxton based his work on a combination of earlier surveys and his own independent mapmak-

ing, whereas Smith's 1776 chart clearly shows the influence of the Fry-Jefferson map of 1751. Rivers and creeks that had been indicated only by sketchy lines on the earlier chart were drawn in some detail on Smith's revision, while additional sailing directions and tables were included to clarify Hoxton's older notes. Other details made the Anthony Smith map an improvement over Hoxton's chart. It was engraved by Thomas Jefferys, one of the finest craftsmen in England during the mid-eighteenth century. The published version of Smith's "New and Accurate Chart" of 1776 was a delight to the eye as well as a precise tool for navigation.

Until its worth was rediscovered in 1953 by the historian Arthur Pierce Middleton, Anthony Smith's chart received little recognition in America. In the 1770s, while Jefferys was engraving the map, the course of world history intruded harshly, setting British colonial subjects against their mother country. Smith's chart became a weapon against the Chesapeake settlements rather than an encouragement to commerce as it had been originally intended. The Chesapeake was a focal point for rebellion when Virginia's last royal governor, John Murray, Earl of Dunmore, was forced to flee from Williamsburg to the protection of British warships anchored in the bay. Throughout the rest of 1775 and into the early months of 1776, Dunmore's fleet attempted to regain power by raiding "rebel" strongholds in tidewater Virginia. On New Year's Day, 1776, Norfolk was burned to the ground, caught between a naval bombardment and zealous firebrands who set houses ablaze to prevent their capture. In London, Thomas Jefferys was still at work on the copperplates for Smith's map and added the ominous words "burned January 1st 1776" below the little town symbol for "Norfolk Borough."

It is ironic that Anthony Smith's map was to assist British men-of-war in attacking his homeland, especially as Smith himself was apparently not loyal to the crown. In 1776, he

signed the Maryland Oath of Allegiance to the "United Colonies." A year later, at the age of forty-nine, he died.

In the eighteenth century, there was little "classified information." Even the most secret treaties and battle plans were quickly leaked to the enemy. Within a year of its London publication, copies of Smith's "New and Accurate Chârt of the Bay of Chesapeake" were in the hands of French engravers working for G. L. Le Rouge, "Geographe du Roi à Paris." In nearly all respects the four-sheet map they produced was identical to Jefferys's engraving; even the sailing notes and legends followed Anthony Smith's originals in a clumsy word-for-word translation. (See Appendix)

By the time of this cartographic piracy, France had become the strongest European ally of the new United States of America; and in February 1778, "His Most Christian Majesty" Louis XVI, hoping to revenge himself against Britain for the humiliating French losses in America in 1763, signed a treaty of alliance with the thirteen United States. Shortly afterward, large quantities of military supplies from France began to cross the Atlantic Ocean, much of it destined for the Chesapeake. Since the bay offered a multitude of partially concealed natural harbors, the French navy prepared a smaller and more practical chart of its waters, based on Le Rouge's edition of Anthony Smith's map. By mid-1778, the smaller version of the *Carte de la Baie de Chesapeake* was engraved and published at the "depôt à cartes et plans de la marine" (office of naval cartography) for inclusion in the *Neptune Americo-Septentrional*, an atlas for the use of officers in the French Royal Navy. In addition, the *Carte de la Baie de Chesapeake* assisted many of the Gallic merchantmen and naval officers in avoiding shoals and locating the deep channels. Although reduced in size, the small version retained all the information and notes that appeared on the larger English and French editions. Not only were the sailing directions and tables com-

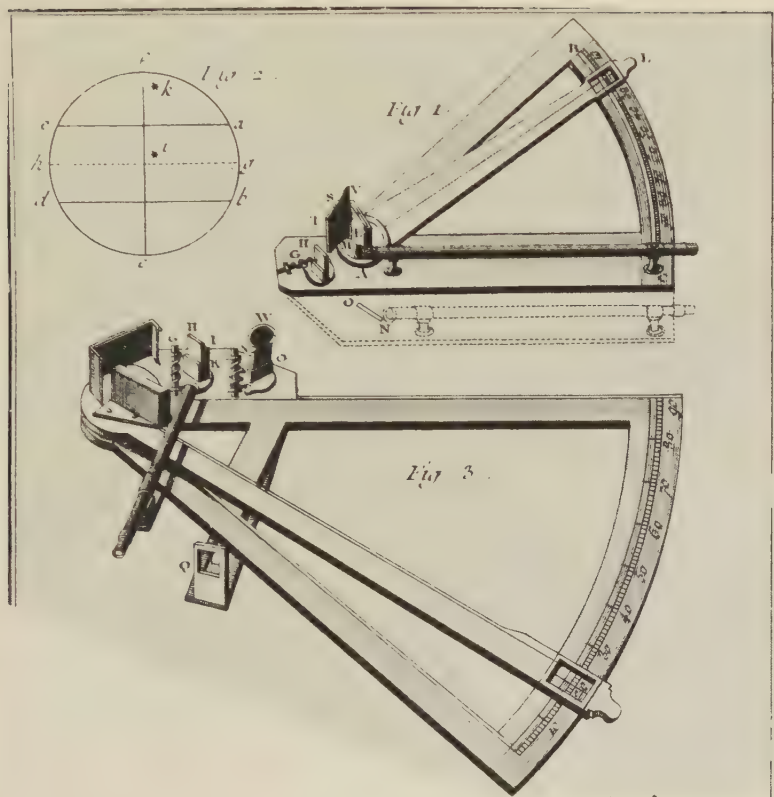
*Yorktown*

plete, but the French translation was more precise and idiomatic than the data on the four-sheet edition.

In its general layout, the new “Carte” adhered faithfully to the Hoxton-Smith-Le Rouge series. Unlike its predecessors, however, the small chart did not rely only on outlines: all land masses were stippled with a pattern of dots to produce a half-tone shading.

Late in 1780, following a successful year in the Carolinas, the main British army in America, commanded by Charles, Lord Cornwallis, moved against Virginia. Cornwallis hoped to demoralize the state and cause it to surrender, after which he planned to sail northward to join the rest of the British forces. Throughout the summer and early fall of 1781, Cornwallis’s strategy worked well. By August, the British had taken control of the Norfolk-Hampton Roads area and commanded the lower peninsula between the James and York rivers. Yorktown became a British garrison, protected by elaborate earthwork fortifications.

Meanwhile, large British and French fleets jockeyed for



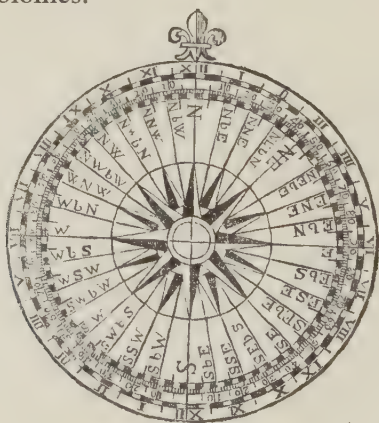
Hadley's quadrant

In the eighteenth century, John Hadley developed a quadrant that used a prism to correct parallax, or distortion, in taking altitudes. Basically an evolutionary step in the development of a series of instruments which began with the medieval astrolabe and kamal, Hadley's tool became the standard navigational device for the next two centuries.

superiority in the West Indies. Among the maps carried by the rival armadas were charts of the Chesapeake Bay based on Anthony Smith's 1776 map. Each commander realized that he had to check his enemy and enter the Chesapeake to affect the outcome of the war. In August 1781 the British naval

expedition in the West Indies under Admiral Samuel Hood eluded the French and sailed for the Chesapeake. Hood joined the main British fleet off the New Jersey coast, but when the combined force made ready to enter the Chesapeake on September 5, the French fleet from the West Indies had already reached the Virginia capes. The ensuing naval engagement lasted throughout the night until—after high casualties on both sides—the French drove off the British. With the aid of superior seamanship and good charts, the French assumed control of the Chesapeake and bottled up Cornwallis's army at Yorktown, which the allied French and American armies had already encircled. Although the British defeat at Yorktown on October 19, 1781, was primarily a land victory for the United States, it would not have been possible without the French naval triumph a month earlier. Certainly at least a small share of the credit for American independence must go to Anthony Smith, dead since 1777, for his excellent naval chart.

The American and French victory at Yorktown virtually ended the war in America. Within a year the British recognized that the United States were in fact "free and independent states." The emergence of the new nation brought with it a need for maps that would depict the new boundaries of the former British colonies.



CHAPTER 5

AFTERMATH OF REVOLUTION

Thomas Kitchin's Map of the United States, 1783

Were there nothing at stake between the Crowns of Britain and France, but the lands on that part of Ohio included in this map, we may reckon it as great a Prize, as has ever yet been contended for, between two Nations.

Lewis Evans, 1755.

PEACE!

After seven years of war, the “Middle British Colonies” had become the “Thirteen United States of North America.” As of November 30, 1782, the former colonies were officially free and independent of English rule, although the inhabitants would not learn of their altered status until March 1783.

In London, once the news had been published, map and print sellers lost no time in attempting to “scoop” their competitors with colorful maps of the infant republic. They dusted off old copperplates of “the colonies,” carefully eradicated all references to colonial or provincial place names, and engraved the new boundary and treaty lines on them. By the spring of 1783, Londoners could choose from among several “new and accurate” maps of the United States to paste into their atlases.

Before the passage of international copyright laws in the nineteenth century, plagiarism in all forms of publishing had little of its present stigma. Not only was outright copying accepted as a customary part of the printer’s trade, but many reputations were based on the ability to copy well and on the judgment to choose only the best original works to “adapt.”

A number of printers became wealthy and respected authorities on geography without ever setting foot outside London. One of the foremost geographers who engaged in the wholesale revision of older maps depicting North America was Thomas Kitchin, Sr., whose London shop was "at the Star, opposite Ely Gate, Holborn."

A variety of maps of America issued from Kitchin's establishment between the 1750s and 1784, the year of his death. His work was constantly in demand for the *London Magazine* and for the numerous volumes on travel and world history that delighted readers in the second half of the eighteenth century. Kitchin was an excellent craftsman, and his engravings are characterized by extreme clarity and sharpness of line.

Kitchin's *Map of the United States in North America* appeared in May 1783, a scant five months after the preliminary articles of peace had been signed and four months before the definitive treaty of peace had been agreed to. Virginia, outlined in green, occupies nearly a third of the map and exhibits considerably different contours from those depicted on the other maps in this portfolio. The Kitchin map (Facsimile 5) includes a vast western empire that Virginia claimed for about twenty years: the territorial wealth promised by Virginia's colonial charter of 1609 but achieved only after the French and Indian War.

On their maps, neither John Smith nor Augustine Herrman had shown any topographical details farther west than present-day Richmond, although Herrman had added several notes based on Indian myths of a "goulden, or brass hill" and great

← *The treaty of peace that settled the United States boundary,
November 30, 1782*

This broadside, printed in Philadelphia on March 19, 1783, was the first "news release" of the Anglo-American boundary agreement after the Revolutionary War. Article 2 outlined the geographical locations through which the imaginary line passed.

mountains, "the very middle Ridg of Northern America." The first edition of the Fry-Jefferson map, published in 1754, revealed only the sketchiest idea of the Ohio River Valley. Few cartographers had ventured into the "Old Northwest" before the mid-1750s. Most of the hardy Europeans who ventured beyond the Alleghenies were French *coureurs de bois*, or "bushrunners," who became Indians for all practical purposes. In their quest for freedom and furs, these French soldiers of fortune explored most of central North America from the Arctic Circle to the Gulf of Mexico but left almost no records of their travels.

Yet as early as 1670 and 1671, while William Faithorne was engraving Augustine Herrman's map, two small expeditions of English-speaking adventurers crossed the Blue Ridge Mountains looking for gold mines and the "South Sea." They found only more land and turned back. Between 1673 and 1716, several other explorers were also lured westward, but their exploits were soon forgotten. The only legacy that resulted from their journeys was a hazy and often inaccurate knowledge of vast forests, great rivers, and savage Indians.

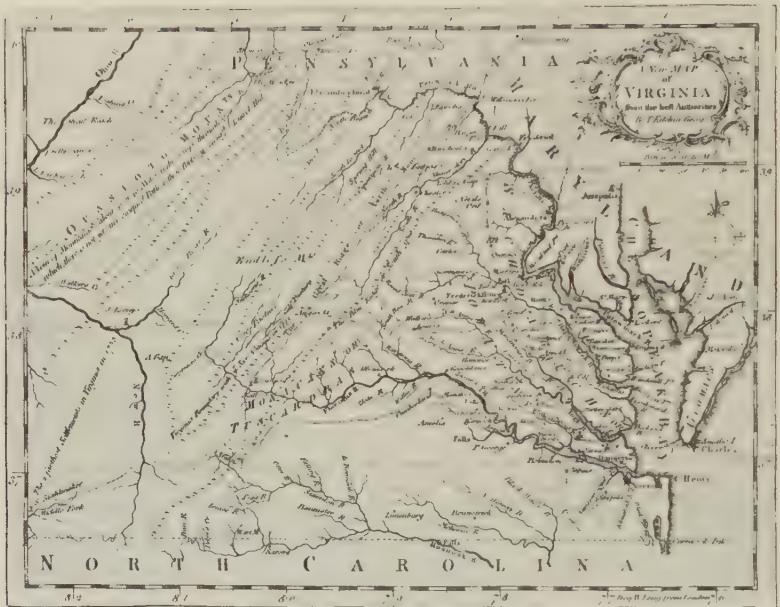
The first significant exploration of the west occurred in 1716, when Alexander Spotswood and a group of companions known as "the Knights of the Golden Horseshoe" crossed the central Blue Ridge, searching for iron ore and sites for new settlements. As Virginia's deputy governor under the Earl of Orkney, Spotswood publicized his findings more extensively than had his predecessors. Within the next three decades, a few traders and settlers began leaving the "too civilized" tidewater area and pushing west, lured by Indian furs and the promise of personal freedom.

Once again, commerce and warfare proved to be the great incentives to mapmaking and exploration. In the years immediately preceding the French and Indian War, able surveyors like Joshua Fry, Peter Jefferson, Christopher Gist, and

Lewis Evans had realized that the key to English control over the Ohio Valley lay in a thorough knowledge of its geography. Perhaps the most influential map of North America in the eighteenth century (or at least the most widely copied) was Lewis Evans's *General Map of the Middle British Colonies in America*, published in 1755, just four years after Fry and Jefferson had completed their manuscript map of Virginia. A year after Evans's map had been printed in Philadelphia by Benjamin Franklin, a pirated version appeared in London. Thomas Kitchin, Sr., was responsible for the unauthorized edition. According to a note in the title cartouche, the Kitchin engraving was "carefully copied" from Lewis Evans's original "with some improvements by John Gibson." In other words,



This is one of the many adaptations of the 1755 Lewis Evans map. The pioneering work by Evans formed the basis for most geographical concepts about the area between Quebec and North Carolina. Thomas Kitchin was among those who pirated the Evans map and published unauthorized editions.



Kitchin's map of Virginia, 1761

This plate was engraved for the London Magazine during the French and Indian War. Like most of Kitchin's other maps of North America, it was based on the 1755 Evans map and the 1751 Fry-Jefferson map.

except for a few minor changes of dubious value, the map was pure piracy. Although Kitchin sold the copperplate to the London publisher Thomas Jefferys in 1758, he continued to profit from the knowledge of American geography he had gained from Evans's original work. Throughout the French and Indian War and afterward, he engraved a number of maps for books and magazines which depicted portions of North America according to Evans's data.

In 1768 Dr. John Blair, a Fellow of the Royal Society, published the curious *Chronology and History of the World from the Creation to the Year of Christ 1753 in 56 Tables*. Among the fourteen maps which Blair included in the book was "A

T H E

Chronology and History
Of the World,
From the Creation to the Year of Christ 1805—
Illustrated in LVII Tables :
Which War, Introductory, include the Centuries from
To the 1st Olympiad ; . . .
And each of the remaining LV Centuries in one expanded Column, or
Or, Half a Century)
By the Rev.^d John Blair L.L.D.

Neque enim res humanæ, an imperiæ aut regionibus divise sunt, et nos habere aut omnia censeamus; quare jam certe, satis ab eis locum ut cum decessu, veluti una Tabula continetur, a delictis nos moveat. —



London:
Printed in the Year, MDCCLXX

Blair's Chronology of 1768

In 1768 Thomas Kitchin engraved a series of maps for John Blair's Chronology and History of the World. The fourteenth map was based on Lewis Evans's "Middle British Colonies," which Kitchin had pirated some years earlier. This plate was revised in 1783 to produce Facsimile 5.

Map of North America from the Latest Surveys and Maps," engraved by Thomas Kitchin. This plate drew heavily on the Lewis Evans map and on manuscript surveys by Lieutenant Thomas Hutchins of the Sixtieth ("Royal American") Regiment of Foot. When Thomas Kitchin issued his *Map of the United States in North America . . . according to the Treaty of 1783* (Facsimile 5), anticipating the definitive treaty by several months, it was nearly identical in format and geography to the 1768 map he had engraved for Blair's *Chronology and History*.

Aside from the title, the principal difference between the two maps is the prominence of the treaty line marking the boundaries of the United States. Both the preliminary and—luckily for Kitchin—the definitive articles of peace specified that the boundary line was to commence "from the north-west angle of Nova Scotia," proceed up the St. Lawrence River, continue through the Great Lakes, and run due west to Lake of the Woods. From Lake of the Woods, the line extended to the Mississippi River and "thence by a line to be drawn along the middle of the said river" until it intersected the thirty-first degree of north latitude below Natchez. The line ran due east along this parallel to the Apalachicola River, then north along the river to the Flint River, then east to the head of the St. Marys River, which it followed to the Atlantic. On Kitchin's map, this line is indicated by a brownish shading which separates the United States from the British dominions of Canada, the west bank of the Mississippi, and West Florida. The provinces of Quebec and Nova Scotia are distinguished by an orange line and Newfoundland by a yellowish-green line.

Virginia, outlined in dark green, stretches west from the Chesapeake to the Mississippi, north up the Mississippi to the Canadian line, and southeast along the Great Lakes to Pennsylvania. Because Kitchin based this map on data gathered between 1755 and 1768, only a few of the many frontier forts



The United States in 1797

This map presents a marked contrast to the state boundaries shown on Thomas Kitchin's map of 1783. No longer does Virginia stretch from the Atlantic to the Mississippi. Not until 1803 would the United States reach the Pacific Ocean.

and outposts created after that time appear. Six major forts are located within the Virginia claim: Miamis, St. Joseph, St. Nicholas, Chicago, Detroit (Pontchartrain), and Sandusky. Notable among the omissions is Fort St. Vincent, or Vincennes, the scene of George Rogers Clark's victory in 1779. Aside from the obvious anachronisms, Kitchin's map of 1783 is quite accurate in showing the treaty lines as they existed after both the preliminary and definitive articles of peace.

Not quite a year after publication of the map, Virginia's boundaries underwent a considerable reduction. On January 2, 1781, the Virginia General Assembly had resolved to cede to the federal government all its claims to the land northwest

of the Ohio River. Following three years of negotiations, the "Old Northwest" was transferred to the United States on March 1, 1784.

Further changes came in 1792, when the Virginia counties south of the Ohio River and west of the Sandy became the state of Kentucky. Thus, nine years after the appearance of Kitchin's map, Virginia had shrunk from a sprawling and unwieldy territory to a more modest state. Nevertheless, several editions and variations of the map remained in print well into the 1790s.

Once Virginia's expansion was limited to internal growth, its cartographic history began to take new directions. As population centers shifted to the central and piedmont sections, new counties were carved out of existing ones and construction began on the first network of planned roads.

In the nineteenth century, Virginia mapmaking was characterized by increasing refinement of geographical knowledge and by a strong emphasis on man-made landmarks. By the end of the century, political boundaries and internal improvements had become as important to mapmakers as the natural features of the land.



CHAPTER 6

“CORRECTED BY ORDER OF THE EXECUTIVE”

The Nine-Sheet Map of Virginia, 1859

When Herman Böye prepared the old maps I had frequent occasion to witness the difficulties he encountered in reconciling the plats he had put together . . . but now the results of his correct operations are lost . . . and we are reduced to the necessity of going again over the same ground.

Claudius Crozet, *Report to the
House of Delegates*, 1855.

In the spring of 1812, as America prepared for its second war with Britain, both federal and state governments began a hasty mobilization for the threatening conflict. Governor James Barbour of Virginia visited the Chesapeake in the last full month of peace to view the fortifications, natural defenses, and militia companies in that area. On his tour he met Colonel William Tatham, an eccentric character who had been at various times a tobacco planter, economist, soldier, engineer, geologist, canal builder, and spy. The English-born Tatham overwhelmed the governor with a torrent of theories about local defense, “telegraphic” communication, a military canal, and other matters which—admitted Barbour—“lay beyond the



The Lewis map of Virginia, 1794

This map, engraved for Mathew Carey's American Atlas, shows all of Virginia and portions of North Carolina, Pennsylvania, and Kentucky. The section of Pennsylvania conforms to the area claimed by Virginia during the French and Indian War, which had been included in the extinct counties of West Augusta and Yohogania.

sphere of my comprehension." Yet some of Tatham's ideas were farsighted and worthwhile.

Tatham showed the governor his extensive collection of old maps, and Barbour, quickly recognizing the value of the collection, deemed it more useful than Tatham's equally large collection of theories. After war was declared in June 1812 the commonwealth pressed some of Tatham's maps into service; though it ignored nearly all of his suggestions. Finally, in 1816, almost a year after the war had ended, the state of Virginia belatedly acted on one of Tatham's proposals. As early as 1791, he had prepared a "topographical analysis" of Vir-



J. H. Young's map of Virginia, 1835

After the Böye map was published in 1826, nearly all later maps of the state were based on it. The Young map was engraved for Joseph Martin's Gazetteer of the State of Virginia.

ginia and recommended that the state sponsor a map constructed along the lines of his study.

In Tatham's opinion, an up-to-date and detailed map of the entire state was needed for planning the formation of new counties and internal improvements. He argued that the state government should conduct its own surveys and should take charge of the actual publication of the map. The utility of earlier maps had been seriously limited because their makers' funds usually ran out before the job was completed. Also, if the mapping were carried out by state cartographers, the governor's office could exercise more control over the quality of the work. The final product would thus be related to specific administrative and geographical problems.

In February 1816, the General Assembly passed two acts that echoed Tatham's philosophy of internal progress. The first created a board of public works to superintend and coordinate efforts to improve transportation; the second authorized the governor to arrange for the preparation and publication of an official state map.

The act required each county court to contract with a competent surveyor to "lay down the outward boundaries" of the county on a scale of two hundred poles to the inch and instructed each county clerk to furnish the surveyor with all existing maps, plat books, and other land records. Each county was to prepare its map on a uniform scale so that all of the county charts could be fitted together to make a map of the state.

But the grand scheme, which also called for mineralogical and hydrographic surveys, came to nothing. Only a few qualified topographical engineers could be found in the state. On January 9, 1817, the General Assembly repealed portions of the 1816 act. The new law authorized the governor, rather than the county courts, to hire the surveyors. Instead of a legion of independent engineers, the mapping team would con-

sist of a chief surveyor and a coordinated group of assistants. They were to construct two maps of each county, one for use in the respective county clerk's office and one for transmittal to the governor; both would show all roads, waterways, and principal landmarks. According to this plan, the governor's office would receive maps of all Virginia counties, as well as surveys of all principal waterways. The copies deposited with the county courts were also intended as a security measure, in case the executive copies were lost or damaged.

William Tatham, who had fondly hoped to be appointed surveyor-general, was not chosen to fill the post, partly because of his age and partly because he was rumored to be an alcoholic. Already on the verge of mental and physical collapse, Tatham broke down completely when he realized that he had not been considered for the job. After announcing his intention to commit suicide, he was killed on Washington's Birthday, 1819, when he deliberately stepped in front of a salute cannon on Richmond's Capitol Square.

Nearly two months after Tatham's death, Governor James P. Preston awarded the map contract to John Wood (1775-1822), a versatile engineer who had recently moved to Virginia. Born in Scotland, Wood had spent much of his early life in France, first as a student of mathematics and "Mechanicks" and later as a political pamphleteer. Wood's propagandizing soon made his departure from France advisable, and in 1799 he returned to Britain to become a master of the Academy in Edinburgh for the Improvement of Arts in Scotland. A year later he emigrated to America, and for a number of years he worked in the District of Columbia as a journalist and a writer of Antifederalist propaganda. In 1815, at the age of forty, he retired to a farm near Lynchburg, Virginia, but soon became bored with the life of a planter. The following July he responded to the governor's advertisements for engineers and was awarded a contract to survey the state's eastern waterways.

Articles of a agreement made and entered into this first day of April 1817 between James M. Smith Governor of the Commonwealth of Virginia acting for the Executive and on behalf of the said Commonwealth of the one part, and John Wood of the City of Richmond of the other part: Whereas by an Act of the General Assembly which passed the 9th day of January 1817 entitled "An Act to re-
 build a fort on it entitled an Act to provide an accurate chart of each County and a general map of the territory of the Commonwealth" the Executive were authorized and required, to contract with one or more persons, for making an accurate chart of each County, as provided for by the first section of the Act entitled "An Act to provide an accurate chart of each County and a general map of the territory of the Commonwealth" which passed the 27th of February 1816, and the said John Wood has accepted the proposals authorized by the Executive in Council which proposals bear date the 27th of June 1817, and engaged to perform the work thereby required in the manner and upon the terms hereon after stipulated. Now these presents witness that the said James M. Smith covenants and agrees to and with the said James M. Smith Governor of Virginia acting for the Executive and on behalf of the Commonwealth of Virginia and his successors in office that he the said Wood will well

Articles of agreement between the state of Virginia and John Wood,
 April 1, 1819

This contract specified that Wood was to complete the "general map of the territory of the commonwealth" within five years. He was to prepare two charts of each county and survey all principal waterways, public roads, cities, towns, courthouses, and villages. The contract also required that he determine by astronomical observation the latitude and longitude of the capitol at Richmond, and of Cape Charles, Cape Henry, Natural Bridge, Point Pleasant, Harpers Ferry, White Sulphur Springs, Cumberland Gap, and the place where the New River intersects the North Carolina border. The state had appropriated fifty thousand dollars for the survey, and Wood was allowed to keep whatever sum was left after his expenses were deducted.

*The honourable the members of the Executive
council of Virginia.*

Gentlemen

*I beg leave to lay before you, two plans of each
of the following eleven counties, which with those I have already
returned complete eighty.*

- | | |
|---------------|-------------|
| 1. Brooke | 7. Giles |
| 2. Ohio | 8. Bath |
| 3. Tyler | 9. Montross |
| 4. Wood | 10. Monroe |
| 5. Harrison | 11. Kenne. |
| 6. Monongalia | |

I have the honour to be

Gentlemen

Your most obedient servant

John Wood

Richmond 14th August 1821

John Wood to the Council of State, August 14, 1821

Wood usually transmitted ten county charts with each of his reports. Since he had only completed nine by March 1821, his next report in August included eleven maps.

Wood was a rapid worker. By August 1817 he had completed surveys of the James, including its north fork, Piankasky, and Rappahannock rivers. In the next thirteen months he surveyed the Potomac, Chickahominy, Pamunkey, and

Mattaponi rivers. Other surveyors worked simultaneously on the western rivers, but few of their maps and reports had the technical excellence of Wood's work.

In the spring of 1819 Governor Preston named Wood as the first surveyor-general for the map project and advanced him three thousand dollars to begin the county surveys immediately. Between the following October and the time of his death in 1822, Wood submitted ninety-six completed county maps to the governor's office, leaving six others unfinished.

Wood's maps were necessarily composites based on his own surveys, those of his assistants, and data from other available sources. Wood himself concentrated on the previously unmapped western counties, including those now in the state of West Virginia. The mapping of tidewater Virginia and of the Eastern Shore was carried out by his assistants, Andrew Alexander, George Wyche, and William H. Merewether, all competent engineers.

In May 1822, while Wood was in Washington, D.C., checking his notes against federal map collections, he became seriously ill. He was taken to Richmond, where he died. To his executor, Andrew Stevenson, fell the task of sorting his great mass of survey notes. In July, Stevenson transmitted Wood's unfinished manuscript maps of Lewis, Nicholas, Lee, Kanawha, Russell, and Scott counties to the governor. This final group of maps brought the total of his county charts to 102. Only Pocahontas County, formed in 1821, remained completely unmapped at the time of Wood's death.

With the first stage of the map project so near completion, the loss of the principal surveyor seemed a blow to the state. A few months later, the governor and Council chose Wood's successor. In November 1822, Herman Böye, a Richmond engineer of German ancestry, agreed to "complete and deliver" a state map to the governor by April 1824. The inclemency

of the winter of 1823 delayed Böye's fieldwork until spring, and the deadline was extended to 1825.

If all of Wood's maps had been drawn to a uniform scale, Böye's work in "reconciling the plats he had to put together" would have been fairly routine. Unfortunately, the difficulty of travel in the western counties had forced Wood to vary his surveying methods after crossing the Blue Ridge. On October 5, 1820, he received permission from the governor to map the far western counties to a scale of 320 poles to the inch, instead of the 200 poles used for the eastern county charts. Alexander, Wyche, and Merewether had further complicated the situation by mapping the Eastern Shore on a much larger scale than Wood had used, although they called it "200 poles to the inch."¹

For nearly three years Böye worked in Richmond, reducing Wood's county maps to a uniform scale. When he had completed this painstaking labor, he plotted his major landmarks on a mathematical projection to compensate for the earth's curvature, taking time out in 1825 to survey Pocahontas County.

Besides carrying on the travel, correspondence, and mathematical calculations necessary to finish the overall state survey, Böye also had to arrange for publication of the map. He solicited competitive estimates from America's leading engravers and received the final bid by the spring of 1825. Four artists were chosen to do the copperplates. Henry S. Tanner of Philadelphia, the publisher of *The New American Atlas*, won the principal contract for engraving the map itself. It was to be done on nine large copperplates, each measuring 20½ x 31 inches. Henry's brother Benjamin was commissioned to engrave an inset of the newly opened University of Virginia, and James W. Steel was to do an inset of the city of Richmond.

1. A surveyor's "pole" or "perch" is usually reckoned at 16½ feet; in actual practice, it can measure almost any length between 10 and 20 feet.



MONONGALIA COUNTY.

Surveyed and Drawn

under the Direction

of

JOHN WOOD

1821.

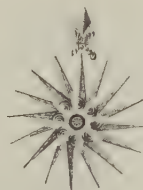
Scale of Miles One Mile to One Inch



*Detail from Wood's
map of*

Monongalia County

*On August 14, 1821,
John Wood sent this map
to Richmond. The title
and scale of miles were not
lettered by Wood personally;
such mechanical details
were done by his assistants.*



POCAHONTAS COUNTY.

Surveyed and Drawn

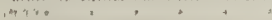
under the Direction

of

H. BOYE.

1825.

Scale of Miles One Mile to One Inch



*Detail from
Herman Böye's
map of
Pocahontas
County*

*After John Wood died in
1822, only Pocahontas
County remained unmapped.
Wood's successor, Herman
Böye, prepared a survey
of the new county in
1825. The title and scale
of miles follow the style
developed by Wood for
his later maps.*

Joseph Perkins, a specialist at engraved lettering, was retained to add an ornamental title and lengthy notes to the map. The team of artists and craftsmen, who spent nearly a year engraving the mammoth 61½ x 93-inch map, completed the work in the spring of 1826.

Böye included three inset notes explaining his sources and the geographical projection used in the construction of his map. A reduced version on four sheets was also engraved by Tanner during 1826-1827. With the exception of the title cartouche and the views of Richmond and of the University of Virginia, the four-sheet map included everything found on the nine-sheet map.

While Tanner was engraving the “reduced,” or “four-sheet,” version of the map in Philadelphia, special presentation copies of the nine-sheet map were prepared. The maps were cut into smaller sections, pasted on thick linen, tinted with watercolors, and bound into boards. In 1827 Governor John Tyler of Virginia, General Lafayette, the American Philosophical Society, and other dignitaries and institutions received these special copies.

In his annual message to the General Assembly, Governor Tyler expressed his satisfaction both with Böye’s cartography and his business acumen. He noted that Tanner, the artist, “has done himself great honor and the State ample justice, in the execution of this work.” Tyler informed the legislature that he had entered into a contract with Böye for printing “four hundred copies of the [Nine-Sheet] Map of Virginia . . . and for reducing the Map, and engraving a plate for . . . publication.” The governor reported that he had taken the precaution to secure the copyright of the small map on behalf of the commonwealth.

The engraved nine-sheet version—the joint product of John Wood, Herman Böye, and Henry S. Tanner—was the most elaborate state map produced in America before 1850, but it

possessed most of the disadvantages inherent in early nineteenth-century cartography. The gothic decoration, which occupied over one-third of the map, increased its size to unwieldy proportions. Geographical errors, caused by Wood's scales and compounded by Böye's attempt to rectify them mathematically, distorted certain portions of the state boundaries. There were, furthermore, no means available in 1826 to verify the data mechanically or visually. Paradoxically, the map's principal defect was its authoritative appearance: it looked so accurate that its users assumed it was virtually perfect. For years few attempts were made to supersede it as the state's base map.

Between 1838 and 1859 the Virginia Board of Public Works gradually assumed control of all state mapping activities. Under the leadership of Colonel Claudius Crozet,² many talented surveyors, engineers, and cartographers struggled with Böye's work in an effort to use it for planning internal improvements.

Their attempts were largely unsuccessful. The creation of new counties during the middle part of the century rendered the western portion of the map obsolete within a few years of its publication. It soon appeared that Böye had resorted to considerable guesswork when "reconciling" the old John Wood surveys to his own geographical data. He had been forced to juggle county boundaries until they coincided, but the points along which they met were not necessarily correct. Later cartographers such as Crozet wrestled with the problems of planning canals, railroads, and turnpikes without a dependable base map of the state. The nine-sheet map proved to be more of an ornament than a useful tool.

Crozet was unable to persuade the General Assembly to scrap Böye's work and allow him to start afresh. During the 1850s the former principal engineer agreed to supervise a re-

2. See Chapter 7.

vision of the nine-sheet map, prepare a new internal improvements map, and coordinate a team of state surveyors to gather information for both maps.³ The old copperplates for the Böye map were still stored in a Philadelphia warehouse, and as the first step towards revision of the map Crozet had them shipped to Richmond. By this time the newer technique of lithography had superseded copperplate etching, and Crozet suggested that a new corrected nine-sheet map be prepared from lithographic stones, using the old Tanner plates as a guide. More concerned with economy than with the finished product, the General Assembly vetoed the suggestion and directed Crozet to retouch the original copperplates which were still usable.

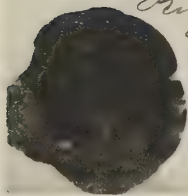
To superintend the actual mapping, Governor Henry A. Wise chose a young German army officer named Ludwig von Bucholtz (or "Buckholtz"), who had served as a captain of artillery and ordnance in his native Wurttemberg before migrating to the United States in 1853. Shortly after his arrival, he found employment as a civil engineer with the Board of Public Works. His superiors found him to be a "gentleman of high character and accomplishment" with a fine talent for cartography. Under his direction, Böye's nine-sheet map was thoroughly overhauled. After the manuscript revision was completed, the state contracted with Selmar Siebert and Company of Washington, D.C., to reengrave the Tanner plates according to Bucholtz's corrections. The plates for the four-sheet reduced map were also corrected at this time.

Because the 1859 state maps, "Corrected by order of the Executive," were printed from the old plates, many serious defects in the original construction were carried over into the second edition. The Bucholtz revision (Facsimile 6), despite its faults, was a definite improvement over the Böye map, especially in its treatment of coastal geography. Areas on the

3. See Chapter 7.

Prussian Legation at Washington
January 28th 1861

The undersigned certifies
here with that he has
been acquainted with Captain
Bucholtz, living in Richmond,
who has been Officer of
Artillery and Ordnance
in the Kingdom of Wurtem-
berg and who was recommended
to me by respectable Persons
of his Country when he came
to the United States, as a
gentleman of high character
and accomplishment in the
ordnance Dept of the German
Kingdom.



Frederich von Geralt
Prussian Minister

Recommendation of Ludwig von Bucholtz to the governor of
Virginia, January 1861

Frederich von Geralt, the Prussian legate in Washington, D.C., testified that
Bucholtz was a "gentleman of high character and accomplishment."

Eastern Shore which had been poorly delineated on the 1826 edition were drawn in minute detail on the 1859 version. Böye's statistical tables were updated to include information from the 1850 census, while the two inset notes were removed completely.⁴ The long notes entitled "Geological Remarks" were not altered, although a state geological survey of 1835-1841 had rendered Böye's concepts of the principal rock formations obsolete. Only the population figures in the last line of the "remarks" were updated.

The knowledge Bucholtz gained on the revision project enabled him to produce several other state maps in the late 1850s. Although none of these matched the nine-sheet map in size or embellishment, all of them were geographically superior because they were not superimposed upon incorrect copperplates.

The Civil War ended Ludwig von Bucholtz's career as a mapmaker. From 1861 to 1865 he served the state as an ordnance inspector and ballistics expert. Unable to resume his civilian occupation in postwar Virginia, he moved to California in the 1870s, where he worked as superintendent of a San Francisco powder factory until his death in 1892.

The antebellum period marked an important transition in the course of American cartography. Although road maps had existed in Europe for over two thousand years, they were a novelty in the United States until the Jacksonian era, when enough roads were built to justify special maps. Facsimile 7 is an example of one of the earliest road maps issued by the Virginia General Assembly.

4. These consisted of county statistics in 1820 and "geographical positions" of major towns. The first table was too closely engraved to allow the insertion of new county names and population statistics, while the second table contained so many errors that it could not be corrected. Consequently, both tables were hammered and burnished out of the copperplate, and the geography of the Ohio River Valley was engraved in their place.

CHAPTER 7

CANALS, TURNPIKES, AND RAILROADS

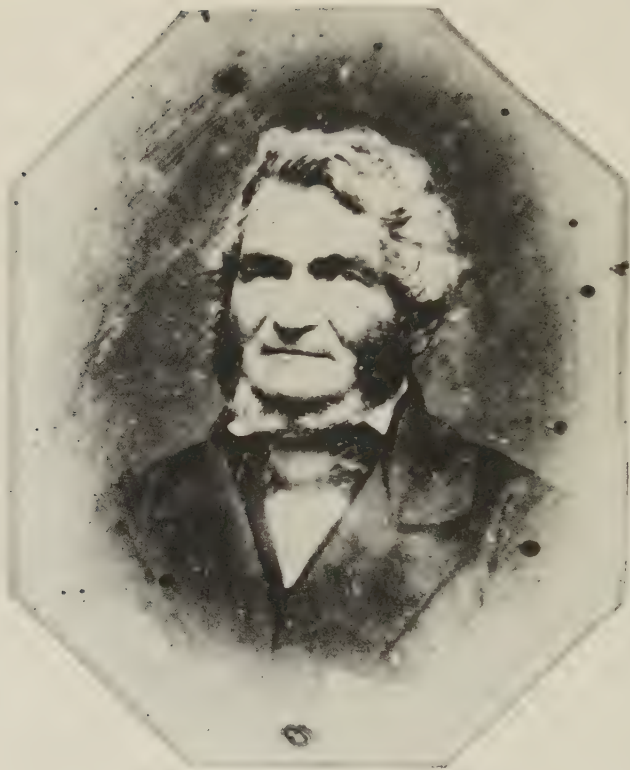
Claudius Crozet's 1848 Map of Internal Improvements

A judicious system of improvement, prosecuted with activity and energy, may now give to Virginia a degree of commercial importance that few other states can attain. She has only to will it.

Claudius Crozet, 1838.

In July 1816 a twenty-seven-year-old French artillery officer arrived in America to begin a new life. The son of a wine merchant, Captain Claudius Crozet had served Napoleon for six years as an artilleryist and engineer. After the battle of Waterloo, Crozet fled Europe for the safety of the United States and, in September 1816, he accepted the post of professor of engineering at the United States Military Academy. A year later West Point came under the superintendency of Sylvanus Thayer, an admirer of French military training who hired several other former Bonapartist officers as instructors during the 1820s.

In June 1823 Crozet left the academy to become the “principal engineer” of Virginia—a key position in the rapidly expanding programs supervised by the state Board of Public Works. For the next twenty years, he directed a series of intensive surveys of Virginia’s major rivers and overland routes; designed bridges, turnpikes, and canal locks; and superintended the actual construction of most internal improvements in the state. As he grappled with the engineering



Colonel Claudius Crozet, ca. 1850

The tousled hair and craggy features of Virginia's chief engineer show plainly in this scratched daguerreotype. In his forty-year association with the Board of Public Works, Crozet was responsible for the development of hundreds of roads, canals, railways, and bridges in the Old Dominion.

difficulties of channels, locks, and dams, Crozet realized that canals could not handle the commercial needs of the future. In the first quarter of the nineteenth century, European inventors had combined the steam engine with cars designed to run on iron tracks. By 1825 steam railroads were operating over short lines in England and in the United States, and more were under construction. Through his reading and corre-



Crozet at leisure, 1827

On a blank page of his field notebook, a surveyor on the 1827 James River navigation project sketched his superior in an attitude of relaxation. Similar sketches enliven several of the extant fieldbooks of the Board of Public Works.

spondence, Crozet had become familiar with the new railway systems, and he saw in the “iron horse” the answer to his problems. But his farsighted views were not shared by his superiors—too much time and capital had gone into canals to consider abandoning them for a newfangled and costly experiment.

Although Crozet was disappointed by the lack of enthusiasm

for his railway proposals, he devoted his best energies to carrying out the projects assigned to him by the board. Thus it was that while Virginia's leading railroad advocate was toiling on canals, a private concern—following a route recommended by Crozet—built the state's first railway. In February 1828 the Chesterfield Rail-Road Company received a charter from the General Assembly to carry coal from Falling Creek to Manchester, a town located across the James River from Richmond. The railroad was not driven by steam—horses and mules provided the power for the thirteen-mile inclined tramway—but it was, nevertheless, a railroad. (Its superintendent, Moncure Robinson, was also instrumental in founding the Petersburg and Roanoke Railroad, the first in Virginia to use a steam locomotive.)

The Board of Public Works, still hesitant to recommend a system of state-sponsored railroads, continued to seek and obtain appropriations for canal projects. In 1831 Crozet resigned his post and moved to Louisiana. He served for several years

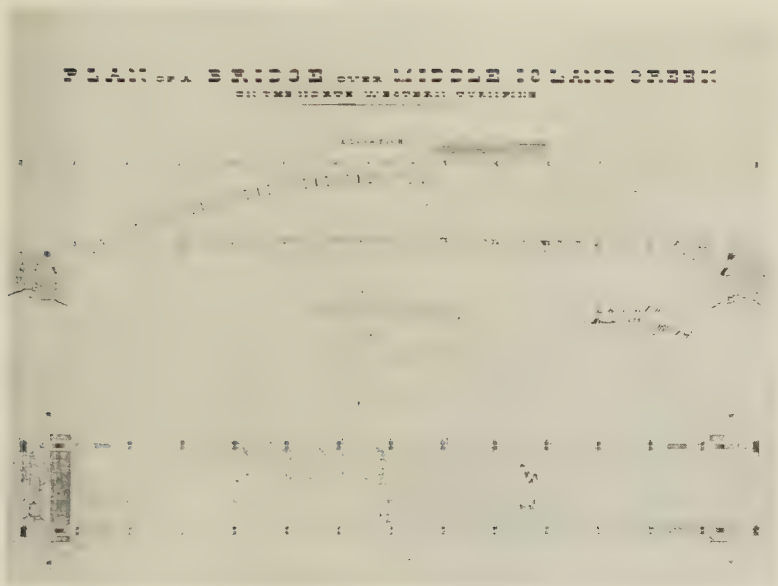
Excursion Train from Albany to Schenectady, 1831



The first Steam Train in America

An early steam locomotive

The tiny engine "De Witt Clinton" pulled America's first excursion train from Albany to Schenectady, New York, on tracks built by the Mohawk and Hudson Railroad. Claudius Crozet was convinced that the steam railway would replace canals as America's chief mode of transportation.

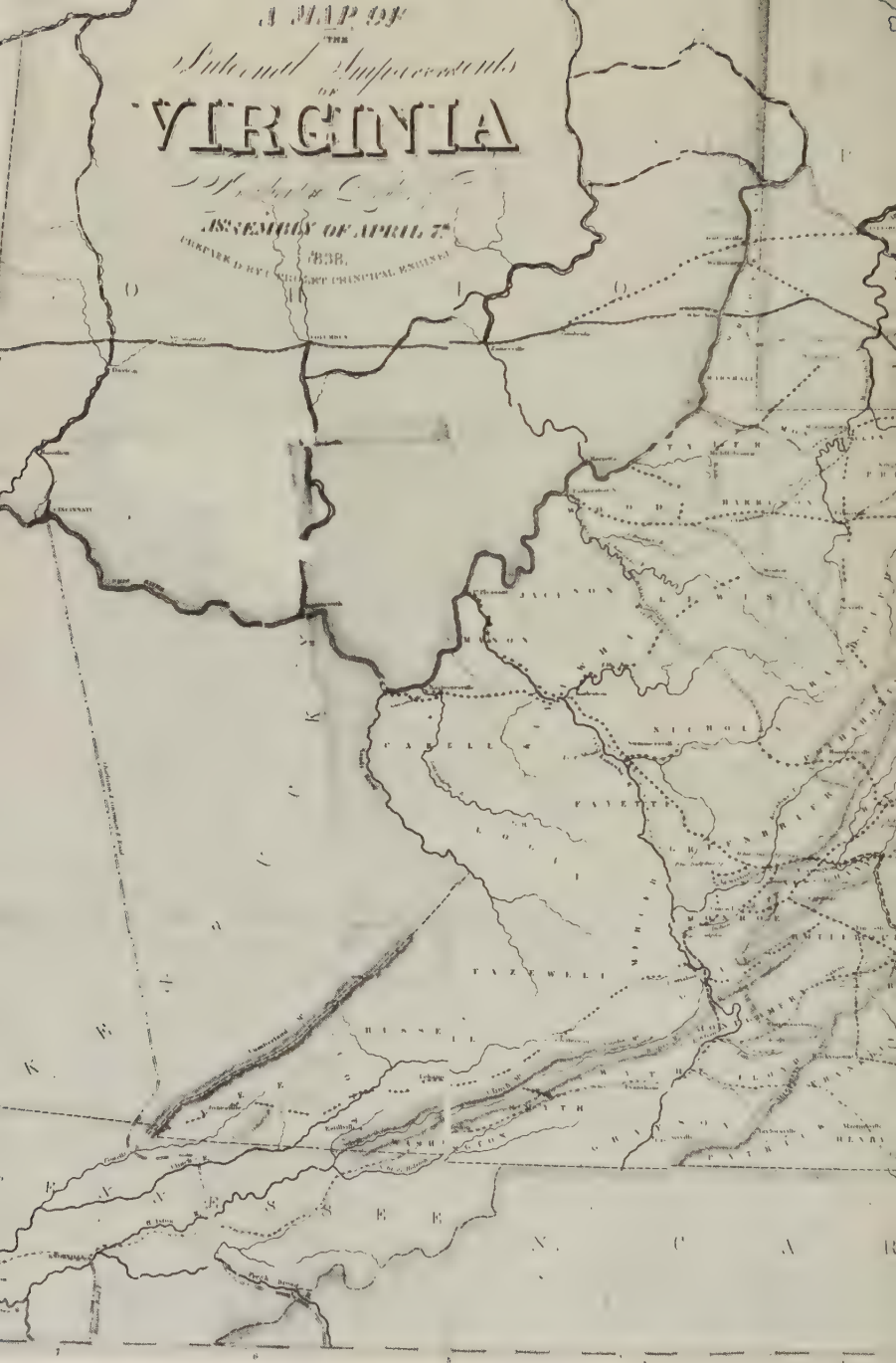


A Virginia covered bridge, 1838

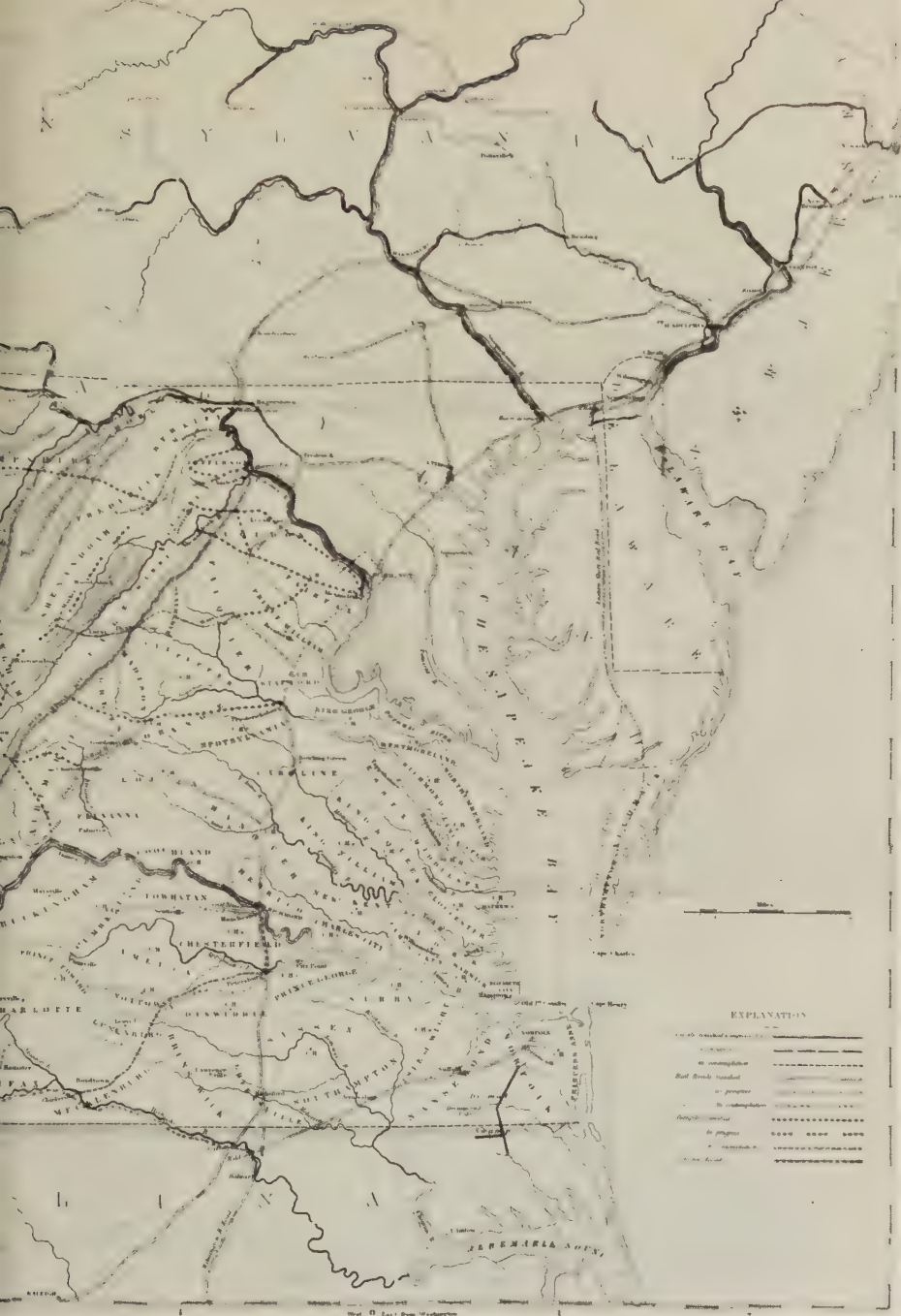
This queen-post truss bridge in Tyler County (West Virginia), was built over Middle Island Creek in November 1838. L. H. Brown, an engineer with the Board of Public Works, drew the plan for Crozet's files in March 1840. Crozet's signature appears at right center, under the side view of the bridge.

as that state's principal engineer and as president of Jefferson College, near Convent, Louisiana. Though he enjoyed living in a French-speaking community once again, his health deteriorated and by 1837 he had left the fever-ridden Mississippi delta to return to Virginia. In his absence, the Old Dominion, reluctantly bowing to technological progress, had decided to adopt the steam locomotive on a limited basis, and several corporations under the direction of the Board of Public Works—most notably the Richmond, Fredericksburg and Potomac Railroad—had begun to operate short passenger lines.

The board welcomed Crozet's return and on April 5, 1837, it reinstated him in his old job. As part of his duties, Crozet



Crozet's first in
Five hundred copies of this map were lithographed for distribution with the Board of Public Works's Report for 1839. It is a hasty and poor production



vements map, 1838

when compared with Crozet's subsequent maps of 1848 and 1855, but it set the style for all later road maps of Virginia.

was expected to direct surveys for new railroads and to design bridges and trestles to carry them across streams. But the acceptance of railroads by the board did not eliminate the other problems that Crozet had faced during the 1820s. Local politics and vested interests continued to hamper his activities. The nation-wide financial panic in 1837 discouraged private investors from backing the various companies regulated by the Board of Public Works, and the profits of the new railway corporations began to dwindle. In addition, many counties built roads that circumvented the turnpike tollgates and effectively cut off some of the revenue that was designed for investment in other roads. The single bright spot in Crozet's career at this time was his connection with the new Virginia Military Institute at Lexington.

On May 30, a few weeks after he had resumed his engineering duties with the state, Crozet was appointed president of the board of visitors for the proposed institute, soon to be known as the "West Point of the South." Like the United States Military Academy, it was to emphasize mathematics and engineering, and it soon became an important source of military and civil engineers. After serving in the regular peacetime army, a large number of its graduates were later hired by the Board of Public Works.

As Colonel Crozet and his assistants prepared the hundreds of drawings, profiles, surveys, and maps needed for planning internal improvements, they became increasingly aware of the lack of sufficiently accurate state maps. The nine-sheet map, published by Böye in 1827, was an attractive guide to Virginia geography for the layman, but it was inadequate as a base map for those involved in the building of railroads.

In response to loud complaints from Crozet, the Board of Public Works finally recommended to the legislature that a new state map be constructed to correct Böye's errors and to show the improvements in transportation made since 1827. In April

1838 the General Assembly concurred and requested that Crozet "cause to be prepared in some cheap and convenient form . . . a lithographic map of all railroads, canals, M'Adamized and turnpike roads constructed or surveyed in this state." The new map was not intended to supersede the Böye publication but merely to supplement it. Crozet had hoped that the Assembly would authorize him to revise the nine-sheet map, but he considered the "cheap and convenient" internal improvements sheet a step in the right direction and set to work on it with enthusiasm.

After six months of labor, Crozet finished the manuscript. He had five hundred copies lithographed on inexpensive paper in time to distribute them with the board's *Annual Report* for 1839. Extremely plain in design and providing only the barest indication of topographical details, the new map depicted the growing network of canals, turnpikes, and railroads which linked the major population centers of Virginia. Some of the "improvements" shown were only in the planning stage, and some were incomplete, but for the most part the map was quite accurate.

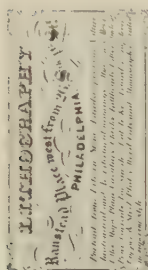
Nevertheless, Crozet was dissatisfied with the result. His assistants had surveyed portions of the state according to his directions, and their field books proved that much of Böye's data was unreliable. In order to plot the road and canal routes on his internal improvements sheet, Crozet had to choose between changing Böye's topography or seriously distorting the new surveys. To effect a compromise, Crozet was forced to use a combination of guesswork and artistic license—hardly the process recommended for producing a technical tool. But the General Assembly found the 1837 map satisfactory, in spite of its faults, and no amount of urging by Crozet could convince the legislature to appropriate funds for a complete revision of the nine-sheet map. Foreseeing no immediate financial assistance, Crozet reluctantly put aside his ideas on

the subject and turned his full attention to the other pressing duties of his post.

Between 1840 and 1843 the Board of Public Works encountered a series of major reverses. The nation was suffering from an alarming economic depression—the state debt amounted to nearly seven million dollars, and revenues from the various improvements had dropped alarmingly. In 1842 a destructive flood wiped out long sections of the James River and Kanawha Canal. The fact that Crozet had warned of such an occurrence did little to endear him to hostile legislators, many of whom were heavy investors in the enterprise. Soon afterward the Assembly cut his salary by one-third, and a few months later it informed Crozet that his services were no longer required. In March 1843 the position of principal engineer was abolished.

In spite of the slap from the General Assembly, Crozet continued his connection with the state government. He remained on the V.M.I. board and served as a consulting engineer to the Board of Public Works.

Several years later, under the provisions of a law passed in March 1848, Crozet made an extensive report to the General Assembly on Virginia's internal improvements. The legislature directed Crozet to prepare "in some cheap and convenient form" a revised map showing the improvements in transportation. The engineer worked quickly, and by June the map and a written "synopsis" of his surveys were ready for printing. Crozet complained that the small appropriation voted by the legislature was inadequate "to the purpose of producing as good a map as I would wish to construct." In order to economize as much as possible, he solicited estimates for having the map either lithographed or engraved on copper. After a number of bids had been received, copper engraving proved to be the more economical method. Last-minute corrections were drawn on the manuscript by his assistant, and Crozet delivered



Philadelphia 2nd Dec 28th 1852

Board of Public Works of Virginia
Richmond

Peter S. Duval Esq. D^r

NOTE: THESE ENGRAVINGS ARE A COPY OF THE STATE MAP FOR SALE BY THE COMMONWEALTH OF VIRGINIA. THE STATE MAP IS THE PROPERTY OF THE COMMONWEALTH OF VIRGINIA. THE STATE MAP IS THE PROPERTY OF THE COMMONWEALTH OF VIRGINIA.

Engraving Map of Improvements	50.00
Reprinting 1854 Imp. of the Board	
1860 for Senate	
34th for Delegates	
5000 Imp. 50" x 40"	500.00
2 Boxes for Same	50
	\$ 550.00

Sincerely yours
C. Crozet

"Paying the piper"—Peter S. Duval's bill, 1852

In May 1852 the Board of Public Works received this statement from Duval & Co. for engraving the 1848 map. Although the actual engraving cost only fifty dollars, printing six thousand impressions cost three hundred dollars.

the map to Peter S. Duval of Philadelphia, one of the best engravers in the country.

In December 1848 he submitted his annual report to the president and directors of the board. Accompanying it were one hundred copies of the new map (Facsimile 7) and a sixty-seven-page pamphlet entitled *Outline of the Improvements in Virginia To Accompany the Map of the Same*. In his covering letter, Crozet noted that "the execution of the map is neater than was called for by the Resolution, being engraved, in preference to a common lithograph." The county boundaries and the routes of improvements were hand-tinted "to add considerably to the clearness and usefulness of the Map."

Crozet devoted a portion of his report to an explanation of

the distortions that appeared on his map, most of which resulted from the maps at his disposal. Examining the county maps and surveys prepared by John Wood between 1816 and 1822, Crozet found that “some are without scales, others give neither courses nor meridian lines, and all of them are generally filled up by guess, with streams, ridges and roads drawn at random, some of them even without real existence.” Böye’s map, based on the Wood surveys, had serious disadvantages as a base map. “Unless one has tried it,” wrote Crozet, “it is almost impossible to realize the great difficulty experienced in attempting to reconcile the various data.” Of the twenty-five new counties that had been created since the publication of Böye’s map, many had never been surveyed. In preparing his own map, Crozet had to resort to guesswork—a process he detested. He stressed the need for a highly accurate copper-



The hazards of travel in the 1850s

Not all “internal improvements” were improvements. David Hunter Strother, better known as “Porte Crayon,” traveled widely in the South during the 1850s as a correspondent for *Harper’s Weekly*. Among his cartoons was this one of a Virginia log “corduroy” road. Crozet’s dream of macadamizing every road in Virginia was still a long way off.

plate "skeleton" or outline map upon which new surveys could be entered from time to time until "a full and perfect map" emerged, ready for the printer.

Despite its imperfections, the 1848 internal improvements map was significant in a number of ways. Aside from its obvious value as an indication of the early economic growth of Virginia, it helped to promote Crozet's long-range plans in the fields of cartography and improved transportation. Considering the poor sources used in its preparation, the map was accurate and well-drawn, but as a tool for future planning it was nearly worthless. Its best features were its clarity and uncluttered format, which were to serve as models for all subsequent railroad and highway maps of the state. Copies of the map were distributed to members of the General Assembly and to the county clerks. Some of the remaining copies were sold commercially.

In his semi-official role as consulting engineer, Crozet could not wield the immediate authority needed to convince the General Assembly that it should appropriate funds for a thorough state survey. He persisted in his efforts, however, and by 1849 he had persuaded a majority of Virginia financiers and lawmakers that his proposals would benefit the state economically.

After enduring a quarter-century of complaints from Crozet and other state engineers, the Board of Public Works recommended that the General Assembly support a new survey of Virginia. Although the legislature hesitated to authorize a completely new map, it instructed the board to assess the situation and to act according to its judgment. Crozet's powers of persuasion, strengthened by his map and report, eventually convinced the board that its needs could best be served by the creation of "skeleton" base maps that could be filled in gradually by a corps of state engineers. In March 1849 the post of principal engineer was reestablished, and Crozet's status once again became official. In addition to planning and executing

such engineering projects as the Blue Ridge Tunnel through Afton Mountain and dealing with rebellious Irish laborers on the project, he found time to recruit a cadre of mapmakers for his project.

For once, there was no shortage of trained cartographers in the state. The revolutions of 1848-1849 in Europe had driven hundreds of refugees to America, many of them trained engineers and skilled craftsmen. A number of Hungarian army officers, including Captain William J. Vaisz, who took up residence in Virginia, settled in the United States during this period of upheaval.

In the fall of 1850 Crozet hired Vaisz to superintend the first major revision of the Böye map (Facsimile 6). The project was designed to provide the Board of Public Works with an adequate base map upon which to construct a geographically correct internal improvements map. Vaisz's first task was to reduce all county surveys "of probable accuracy" to a scale of five miles to the inch. These were to be transferred to an outline map of the state in nine sheets—each sheet pasted on a "dried and seasoned" drawing board. Portions of the old copperplates for the nine-sheet map, still in storage at Tanner's establishment in Philadelphia, were to be used in the preparation of the "skeleton" map.

Throughout 1851 Crozet and Vaisz corresponded with Professor Andrew D. Bache of the United States Coast Survey and Benjamin Henry Latrobe of Baltimore, two of the most respected topographic engineers in America. Both Bache and Latrobe had access to the voluminous files of the Coast Survey and of the United States Corps of Engineers, as well as to private libraries in America and Europe. Engineers and astronomers throughout the country offered various forms of assistance to the Virginia map project and suggested new methods for the determination of longitude.

In 1852 two other engineers were added to the project—

Andrew Talcott, a Virginian, and Captain Anthony Kanalassy, another former Hungarian army officer who had emigrated to Virginia. Talcott was assigned the task of taking astronomical observations to determine the latitude and longitude of certain landmarks. Kanalassy was charged with the actual preparation of the internal improvements map. In April 1852 Crozet reported that the revision "is progressing by the hands of Captain Kanalassy, and must soon be ready for printing, if the Board judge proper to have it done." In May Kanalassy informed the board that he had prepared a map of the entire state in two sheets and had completed mapping internal improvements in the western portion of the state. Wherever boundary lines did not coincide, he had lightly penciled in the approximate correct locations. All points "fixed" astronomically by Captain Talcott had been included in Kanalassy's internal improvement sheets, as well as in Vaisz's sketches for the nine-sheet map.

While the revision of the Böye map proceeded steadily, work on the internal improvements map was delayed by unforeseen difficulties. Kanalassy fell sick and in August 1852 he resigned, leaving the eastern half of the map unfinished. He died shortly afterward. In order to complete the map, Crozet had to divide the remaining work among other engineers. The map as originally planned was to carry Kanalassy's name, and a statement that the work had been done "Under the supervision of C. Crozet, Esq. 1852." When the map finally appeared early in 1856, Kanalassy's name had been dropped from the title and only Crozet's name remained. According to Crozet's report of November 22, 1855, Kanalassy's map had been completed by Ludwig von Bucholtz, the cartographer who had been employed on the revision of the nine-sheet map.

The 1855-1856 internal improvements map was to be the last in Crozet's transportation series. The most elaborate of the three, it conflicted with Crozet's philosophy of the trans-

MAP OF VIRGINIA SHOWING STATE AND COUNTY HIGHWAY SYSTEMS

STATE HIGHWAY COMMISSION
1922

DENVER

WASH.

VERMONT

GOVERNOR
CLAUDE A. SWANSON



COMMISSION
CLAUDE A. SWANSON
J. H. SWANSON
J. H. SWANSON
J. H. SWANSON



THE MARKERS ON EACH STATE
HIGHWAY ARE NUMBERED TO CORRESPOND
WITH THE NUMBERS ON MAP

— LEGEND —

STATE HIGHWAY IMPROVED
STATE HIGHWAY IMPROVED ROAD IMPROVED
STATE HIGHWAY IMPROVED ROAD IMPROVED
COUNTY ROADS IMPROVED
COUNTY ROADS IMPROVED



Virginia

In the first decade of the twentieth century, Governor Claude A. Swanson created a primitive and nearly powerless highway commission to improve Virginia roads. With the impetus given by World War I and the development of the automobile, a more effective commission was created by Gov-

ernment maps. He had stated that "topography and boundaries of counties are only accessories for illustration of the localities." The third internal improvements map, lithographed



way map, 1922

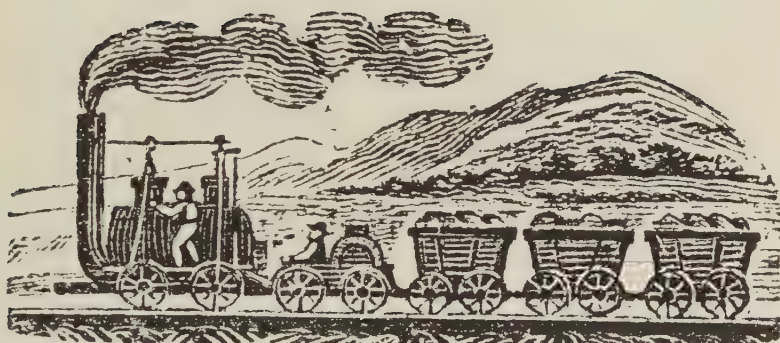
ernor E. Lee Trinkle in 1922. Under chairman Henry G. Shirley, the new commission began hopefully but foundered badly in a storm of controversy over bond issues. Not until the Second World War did Virginia's highways begin to catch up with other eastern state roads.

in colors, contained such complete renderings of mountains and waterways that the man-made improvements were often obscured, particularly in the western counties.

Although most of the work had been done by Kanalassy and Bucholtz, Crozet's name appeared alone on the published map, and he was blamed for the errors that appeared on it. In his report to the board on March 4, 1856, Crozet explained that he was fully aware of the inaccuracies that marred the internal improvements map. Once again his report became a vehicle for proposing map reform in Virginia. He stressed the need for a central agency, organized on the plan of the United States Coast Survey, to coordinate the mapping projects of the Board of Public Works, the Virginia Military Institute, and other state departments. "Without it," he argued, "every new [map] issue will be as defective as the preceding."

Like many of his other ideas, Crozet's concept of a central mapping agency was ahead of its time. Neither the General Assembly nor the financiers associated with the Board of Public Works fully understood the difficulties of mapmaking. Even the federal government was slow to adopt a uniform series of maps. Throughout the Civil War and the two decades following it, the United States carried on several independent mapping projects simultaneously. Not until 1879 was there a central "bureau"—the United States Geological Survey—to superintend the mapping of the entire country to a uniform scale.

Although the Civil War disrupted the economic and intellectual life of the South, some of the finest nineteenth-century maps of Virginia were drawn by army topographers for the Union and the Confederacy. Military mapmaking requires more precision than most forms of cartography because human lives often depend on a single map. The Civil War spurred the creation of a series of topographic maps, drawn with meticulous and artistic detail, that exceeded in accuracy nearly all earlier American maps.





Peter Smith Michie

This photograph was made during Michie's postwar career as a professor of physics at West Point, a post which he held for thirty years. He was instrumental in forming West Point's first football team in 1890. Michie Stadium was named for his son, Dennis, the team's first captain, who was killed in the Spanish-American War. (Photo courtesy U.S. Military Academy Archives.)

CHAPTER 8

A BELEAGUERED CAPITAL

Captain Peter S. Michie's Map of Richmond, 1865

The Confederate commanders knew no more about the topography of the country than they did about Central Africa . . . we were profoundly ignorant of the country, were without maps, sketches, or proper guides, and nearly as helpless as if we had been suddenly transferred to the banks of the Lualaba.

Gen. Richard Taylor, C.S.A.

On June 11, 1863, the United States Military Academy at West Point conducted its annual commencement exercises. Standing second in his class, twenty-four-year-old Peter Smith Michie proudly accepted his diploma, an army commission, and the shiny pips of a second lieutenant of engineers.

While Michie and his fellow graduates were being transformed from cadets into officers and gentlemen, the American Civil War was spilling out of Virginia and threatening to engulf the North. In June Lieutenant General Richard S. Ewell's II Corps, Army of Northern Virginia, crossed the Blue Ridge Mountains and began its invasion of Pennsylvania. Among Ewell's subordinate officers was Jedediah Hotchkiss, the corps's talented engineer and cartographer. Though buoyed by victory at Chancellorsville, the veteran troops of the II Corps still mourned their former commander, "Stonewall" Jackson, who had been mortally wounded by his own men a few weeks earlier.

Peter S. Michie and Jed Hotchkiss are considered by many authorities to have been among the finest cartographers produced by the Civil War. The two men never met each other during the four years of conflict, but between 1861 and 1865 their activities, combined with those of their colleagues, altered the course of Virginia mapmaking. In the decades after the war, they collaborated on a series of battlefield maps which were published in the 1890s in the *Atlas to Accompany the Official Records of the Union and Confederate Armies*.

During the eighteenth century, military topography had emerged as a distinct branch of cartography. As one nineteenth-century authority put it, "Military topography . . . seeks to imitate sinuosities of ground . . . different kinds of roads, the position of fords, and extent of woods." To achieve the detail necessary for military usage, army topographers began to abandon the use of maps showing entire nations or states and to substitute smaller area maps of uniform size. During the American Revolution, French engineers under Rochambeau had created a series of small topographic maps showing each encampment between New York and Virginia. The wealth of accurate and delicate detail in their watercolor sketches can hardly be surpassed by modern cartographers. Although only a few Americans saw any of the Rochambeau maps, copies of several plates survived in the files of the United States War Department and were used again during McClellan's Peninsula campaign of 1862.

In 1861, at the outbreak of the Civil War, both Union and Confederate armies were equally ignorant of Virginia topography. Virginia, the major battleground of the war, had not been extensively mapped by military engineers since 1781, and Bucholtz's revised nine-sheet map of 1859 was of little use to the contending armies.

As the novice soldiers swarmed over Virginia in the first year of the war, they found—all too often—that places which

looked close to each other on the Bucholtz map were farther apart than they were supposed to be, either by actual mileage or because of unrecorded natural obstacles. They also found other disadvantages.

The 1826 and 1859 editions of the nine-sheet map were identical in many ways. Coastline revisions, county boundary changes, and major internal improvements had been added,

imn.



A "balloon view of the seat of war," 1861

The earliest sixteenth- and seventeenth-century maps of America were semi-pictorial, attempting to show both perspective and topographical views simultaneously. In the nineteenth century, after the development of photography, several "aeronauts," or balloonists, succeeded in making aerial photographs. The cumbersome cameras and wet-plate equipment necessary was too expensive for extensive aerial mapping, but clever artists were able to photograph large globes or topographical models and produce realistic "bird's-eye views" for popular magazines, such as Harper's Weekly. This map appeared in 1861, showing the east coast of North America from the head of the Chesapeake to the Florida Keys (upper right). Although this map is imaginary, it closely resembles actual photographs taken by astronauts on the Apollo missions.

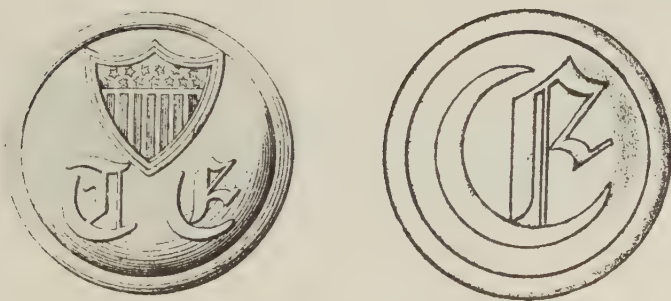
but most smaller details such as "common roads" were left unchanged. Consequently, both editions failed as road maps. Thanks to canals and railroads, many roads had fallen into disuse or disrepair since 1826. Even a relatively adequate dirt road of 1859 could not withstand the heavy military requirements of 1861. Officers, seeing the symbol for "common road" on the map, planned their movements under the assumption that the road was usable and still existed. All too often, the "common road" turned out to be a quagmire in which long columns of infantrymen floundered knee-deep and baggage wagons sank up to their hubs.

The topographic symbols used on most available Virginia maps also proved deceptive. A map might indicate level ground but give no clues to the density of forests and undergrowth. Bucholtz's single symbol for a bridge did not differentiate between a small footbridge and a heavier span that could support the weight of baggage trains or field artillery. "It may be broadly stated that we had no military maps of any value," lamented Union General George B. McClellan after the war. Other federal officers termed Virginia a "*terra incognita* for military purposes." Such statements were typical of the attitudes prevailing among the commanders who were forced to rely on inadequate maps. Virginia was not the only state without good military maps in 1861, but the lack was especially serious because of the commonwealth's strategic importance.

While the scarcity of detailed maps hindered the war effort of both sides, it stimulated the most intensive mapmaking projects that had ever been conducted in Virginia. Neither army attempted to revise the nine-sheet map or any of the other general state surveys; both concentrated instead on producing uniform sheets, each covering only a few square miles. All relevant landmarks for military operations were included: the names of householders, fordable creeks, ground contours,

natural defenses, and sources of drinking water.

Most of the sector maps that were used in the field after 1862 were prepared by topographical engineers accompanying the armies. Because there were no reliable published maps, these military topographers were forced to depend on their skills to produce what was needed. Prior to the war, American cartographers had developed their techniques independent of European influences. Except for such immigrants as Claudius Crozet, William Vaisz, and Anthony Kanalassy, most American mapmakers were natives, trained before the 1860s. After Fort Sumter fell, the United States War Department encouraged many German, Hungarian, and French cartographers to come to America and serve in the Union army as topographical engineers. These men brought with them the latest European advances in surveying and drafting techniques.



Buttons of the topographical engineers

During the Civil War, each branch of service had its own distinctive buttons and insignia. Union topographers wore the United States shield and the letters "T.E." in Old English script, while the Confederate engineer officers wore either an "E" or a "T" on their buttons.

The relatively new art of photography was used to copy and distribute revised battle maps. With mass-production methods, a map could be drawn on oilcloth in the morning, blueprinted in the afternoon, and distributed to each field officer by late evening. In the last year of the war, the Union Army of the Cumberland regularly carried with it a photographic darkroom on wheels (dubbed the “whatizzit” wagon by the troops), a portable printing press, two lithographic presses, a full staff of photographers and draftsmen, and several specialists in map mounting. The Union Army of the Potomac had a similar but smaller entourage of topographers, one of whom was Peter S. Michie.



Union war balloon, 1861

The Union and Confederate armies both employed balloonists for short periods. The most famous lighter-than-air craft was Thaddeus Lowe's Intrepid, which assisted the Union at the battle of Fair Oaks in 1862. Occasionally, a balloon would be moored to a gunboat and towed along waterways, creating a primitive "aircraft carrier." Not until World War I were air observers a vital part of army maneuvers, but their potential was proved in the Civil War for the first time.

Speed in drawing, copying, and distributing maps often became more important than absolute accuracy in surveying. Since neither of the contending forces had accurately mapped the future battlegrounds in peacetime, both sides were forced to do most of their mapping under hazardous conditions. In one respect, the Confederate topographers in Virginia had an easier time than the Union engineers: they were mapping in friendly territory. It was common practice for Southern civilians to offer deliberate misinformation to "the Yankees" engaged in surveying rural roads. This minor sabotage caused major confusion when two corps commanders tried to rendezvous at a certain place only to find that the data on their maps did not coincide. Since time was short, the cartographers rarely had the opportunity to measure each road and ascertain exactly where it led.

As the Union blockade increased in size and effectiveness, the Confederate army began to feel the financial pinch in all its departments. Major General Jeremy F. Gilmer, commanding the Confederate Engineer Bureau, was among the first to be hampered by the blockade of Southern ports. Large numbers of trained cartographers from Europe enlisted in the Federal forces, but few of them came south. The blockade not only prevented Gilmer from securing the services of these foreign specialists; it also made it practically impossible for him to obtain sufficient chemicals and photographic apparatus for the mass production of maps. He and his chief assistant, Captain Albert H. Campbell, devised a method called "brown-printing," which required paper sensitized with salts. Because of the lack of proper fixatives, prints made by the process faded quickly when exposed to direct sunlight.

To a limited extent, the Union and Confederate armies used aerial observers to verify map positions and report on enemy troop movements. "Professor" Thaddeus S. C. Lowe organized a Federal corps of balloonists, or "aeronauts," who



Two maps by Jed Hotchkiss, 1864

These plates appeared in the Atlas to Accompany the Official Records of the Union and Confederate Armies and are fairly typical of the maps that make up the volume. Neither does justice to the meticulous draftsmanship characteristic of Hotchkiss and his contemporaries, but they do illustrate the complexity of wartime maps. Important landmarks, such as churches

performed valuable services during the Seven Days' Battles of 1862. For a time Confederate General Joseph E. Johnston experimented with balloons, but because the hard-pressed Confederacy had little money to waste on "newfangled" contraptions, the Southern balloonists were eventually grounded.

The Confederacy was fortunate that its Engineer Bureau was staffed by exceptionally competent cartographers, including a high percentage of West Point graduates. The best of the "Rebel" engineers, however, was the self-educated Yankee, "Major" Jedediah Hotchkiss. Born in western New York state in 1828, Hotchkiss had learned the rudiments of surveying at a local academy. At the age of nineteen he had gone on a walk-



and railroad crossings, are prominent, while other features, such as political boundaries, are minimized. Both maps were used to illustrate Hotchkiss's reports on the military situation in the Valley of Virginia between May and July 1864. The second map was probably based on surveys made for Stonewall Jackson in 1861.

ing tour which ended in Virginia. He decided to settle in Augusta County, where he began work as a tutor. More than a decade later, in 1859, he and his brother Nelson opened the Loch Willow Academy in Staunton. During the same period "Jed" also worked as a civil engineer, specializing in topographical mapping.

Despite his northern origins, Hotchkiss considered himself a Virginian. When the Civil War broke out, he enlisted in an Augusta militia regiment that was part of the 13th Brigade. Shortly afterward, the Augusta Volunteers were consolidated into the 5th Virginia Regiment of Infantry, a part of "Stonewall" Jackson's command. Jackson, a former professor of mathematics and engineering at the Virginia Military Institute,

knew Hotchkiss by reputation, and made him his cartographer. He ordered Hotchkiss to map the Shenandoah Valley from Harpers Ferry to Lexington, "showing all the points of offence and defence between those points."

Though military mapmaking was new to Hotchkiss, he completed the 150-mile survey in a short time and thereby established his value to the army. Jackson was pleased with Hotchkiss's work and employed him constantly thereafter as a topographer and scout. After Jackson's death in May 1863, Hotchkiss was awarded the post of "first military assistant engineer"—the highest civilian rank in the Confederate Engineer Bureau.¹ Under Jackson's successors, he continued to prepare detailed battle and reconnaissance maps, further refining his methods and developing his uncanny talent for observation. His maps were of higher quality than most Union or other Confederate surveys. He made almost all of his preliminary sketches in pocket-sized notebooks, using colored pencils which were attached to the inside covers. Without dismounting from his horse, Hotchkiss—a little book on his knee and a compass in his bridle hand—often made dozens of notes and sketches in a day.

Hotchkiss had no single counterpart in the highly efficient Union war machine, but Captain Peter S. Michie came as close as any other engineer officer. Born in Scotland, Michie had emigrated with his family to Ohio and had received his appointment to the United States Military Academy from that state. Almost immediately after his graduation, the new lieu-

1. Hotchkiss's hopes for military promotion were blocked by General Gilmer of the Engineer Bureau, a North Carolinian. Gilmer, who thought there were already too many Virginians in his department, refused to authorize a vacancy carrying the rank of major. Through the efforts of Jackson and other influential officers, Hotchkiss finally received a temporary executive commission as a captain of engineers, but the appointment was never ratified by the Confederate Congress, and there is no extant record proving that Hotchkiss ever received any military commission higher than his captaincy.

tenant was assigned to the Corps of Topographical Engineers, commanded by Major General Andrew Atkinson Humphreys. Within a year, Michie was promoted to a captaincy in the Engineer Department of the Army of the Potomac. His immediate superior, Major Nathaniel Michler, utilized the young officer's talents to the fullest, sending him on numerous missions to prepare battle maps—a task that sometimes took Michie behind enemy lines.

Unlike Hotchkiss, Michie was trained in the science of fortification. He had spent most of his early career assisting with the defenses at Morris Island in South Carolina and at Drewry's Bluff and Dutch Gap in Virginia. Brigadier General Truman Seymour, one of his commanders, praised Michie as "always ready, always brave, always skillful." The young officer's record on the staffs of generals Ben Butler and Q. A. Gillmore was equally distinguished. By February 1865 he had risen to brevet major and was acting chief engineer of the Department of Virginia and North Carolina.

During the Richmond campaign of 1864-1865, Michie supervised extensive mapping operations along the south bank of the James River. With his report to Brigadier General J. G. Barnard, chief engineer of the Union armies in the field, Michie enclosed a set of "photographic maps" showing the defenses south of Richmond. Included among the photocopies were views made by army cameramen of the principal Confederate batteries. From the preliminary sketches and wet-plate photographs, Michie prepared a "general map of the country, as far as our troops hold in this vicinity." Even as a copy of the general map was being received at Barnard's headquarters, "triangulation parties" were pushing the surveys closer to the Confederate capital, often dodging artillery shells and minié balls, but progressing a few more miles each day. The Confederate evacuation of Petersburg and Richmond



Map of Richmond, based on Michie's manuscript

early in April 1865 allowed Michie's assistants to finish their work unimpeded by enemy fire.

The war ended in 1865, but some of the best maps of the conflict were not completed until years afterward. Michie gave his manuscript map of Richmond (Facsimile 8) its finishing touches in 1867, and nearly a century passed before it first appeared in print. In 1965 the Richmond Civil War Centennial Commission published the map for the first time to commemorate the last days of the Confederacy.

Michie's James River and Richmond maps represent the culmination of wartime advances in cartography. The drawing technique, which is distinctly European, combines skillful "hachured" shading and stenciled lettering. Each city street and each building appears in sharp detail and the topography is shown with exceptional clarity. Depictions of the Confederate forts and batteries were based on the photographs taken under Michie's direction, and are drawn to scale. The names of householders appear next to their homes and farms. Opti-

cally the maps give the impression of high-resolution aerial photographs.

Under the provisions of two congressional resolutions passed in 1864 and 1866, copies of all significant battle maps were collected by the War Department for use in a projected war atlas, but the actual publication was delayed for nearly thirty years. The first effort was prepared between 1867 and 1875 by General Nathaniel Michler and Brevet Lieutenant Colonel Peter S. Michie. In the latter year Major General A. A. Humphreys, Chief of Engineers, issued a cumbersome and poorly lithographed portfolio, entitled *Military Maps Illustrating the Operations of the Armies of the Potomac and James, May 4, 1864 to April 9, 1865*, and "executed under the direction" of Michler and Michie.

On several occasions during the preliminary drafting of base maps for the 1875 atlas and other projects, Peter S. Michie and his former enemy Jed Hotchkiss worked together. Michie had hired the Staunton engineer in the late 1860s to survey and map the Virginia counties in which Union and Confederate troops had clashed. Some of Hotchkiss's maps were published separately, and some were incorporated into the atlas plates, while others were marketed privately by the cartographer.

In 1880 Congress appropriated funds to print ten thousand copies of *War of the Rebellion: The Official Records of the Union and Confederate Armies*, a mammoth project which included the atlas envisioned by the resolutions of 1864 and 1866. The textual records were issued in 127 volumes, and an atlas appeared in paper-wrapped sections at regular intervals from 1891 to 1895. Nearly all the extant Civil War maps in the War Department files were reproduced in the publication, annotated and keyed to the volumes of text. The credit lines of Peter S. Michie and Jed Hotchkiss appear most frequently on the printed maps among the names of general officers and semianonymous draftsmen. Nearly half of all

Confederate maps in the atlas are signed by or attributed to Hotchkiss, whose military career spanned the entire war. Michie's map of Richmond was adapted for Plate LXXVII, Part 1, which is too small to do justice to the original manuscript. Neither Michie nor Hotchkiss had any direct connection with the actual printing of the atlas, completed exactly three decades after Appomattox. Nevertheless, their influence can be seen in every page of the huge volume.

After their brief association, the two cartographers went their separate ways again: Michie to the professorship in physics at West Point and Hotchkiss to his lucrative practice in civil engineering and mining. Despite his enviable wartime record, Hotchkiss's most lasting achievement in the field of cartography was to come in 1881—when he published the first accurate geological map of Virginia.



CHAPTER 9

DEVELOPING VIRGINIA'S RESOURCES

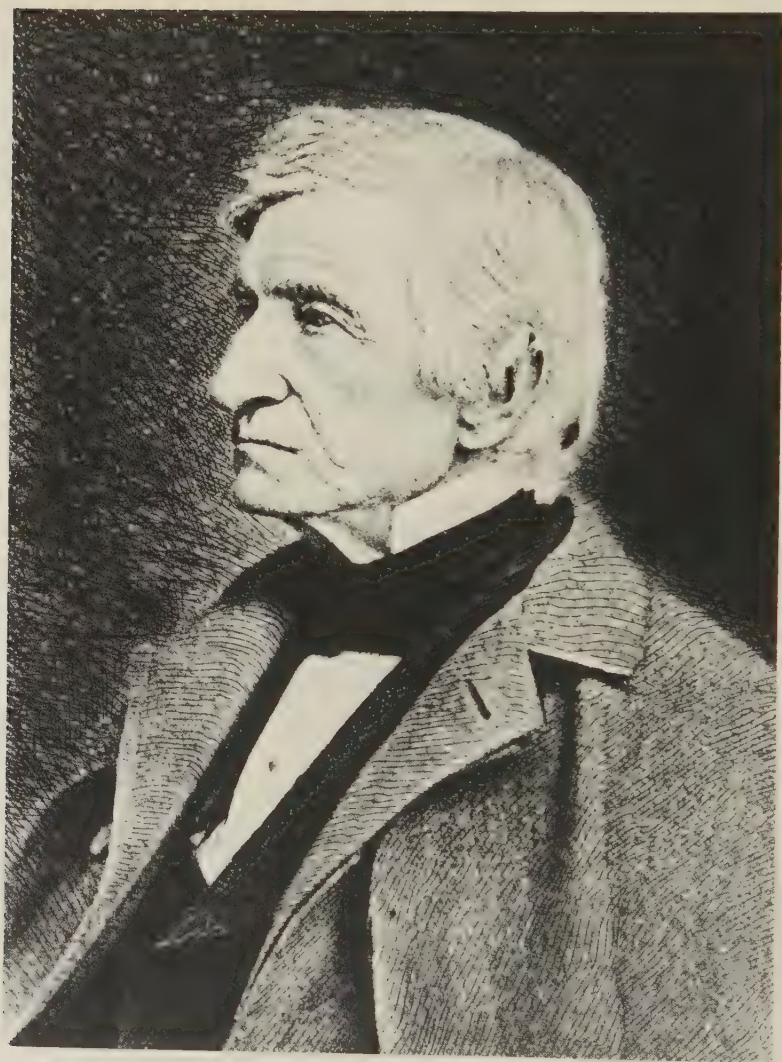
William Barton Rogers and the Geological Survey

A mere description of the geology of a country, if unaccompanied by a map and sections, can convey only a very imperfect idea of the structure and relations of its formations.

William B. Rogers, 1835.

The most recent phase of Virginia cartography began about thirty years before the Civil War, but the explosive force of the war was necessary to bring it to fruition. With the exception of the Böye nine-sheet map, none of the specimens discussed thus far included much significant geological data. Böye had inserted a lengthy and somewhat disjointed table of "geological remarks" on his map which adequately summed up the scanty knowledge of Virginia geology. The first map to show schematically the rock and mineral formations in the state was finished two decades before Virginia seceded from the Union, but it remained unpublished until 1881.

← *An early statistical map. Virginia's slave population in 1861*
This map, sold "for the benefit of the sick and wounded of the U.S. Army," was published on June 13, 1861. The copy illustrated was presented to the secretary of the navy by Captain W. R. Palmer of the United States Topographical Engineers. Based on data from the 1860 census, the map indicates density of the slave population by means of shading. This style of map has become increasingly common in statistical reports, but it was a rarity in the nineteenth century.



William Barton Rogers

Virginia's first state geologist and the founder of the Massachusetts Institute of Technology was photographed shortly before his death in 1882. The methods of classification developed by Rogers for the Virginia geological survey of 1835-1841 were the basis for much nineteenth-century advancement in the earth sciences.

The plan to construct such a map began hopefully enough on March 6, 1835, when the Virginia General Assembly passed a bill authorizing "a geological reconnaissance of the state, with a view to the chemical composition of its soils, minerals and mineral waters." A farsighted piece of legislation, this act created one of the first organized geological surveys in America. The short-lived survey began as a limited and tentative experiment, designed as one of many projects carried out by the Board of Public Works. The object of the undertaking was to provide the state with a basic library of geological information. The plan also called for the establishment of a small museum to house classified mineral specimens.

The 1835 law authorized the Board of Public Works to spend a sum not exceeding fifteen hundred dollars for the work, which was to be performed by a "competent geologist." Professor William Barton Rogers and several assistants were hired soon afterward.

Rogers, a noted expert in geology, held the chair in chemistry and natural philosophy at the College of William and Mary. From his childhood in Philadelphia, he had displayed a strong interest in natural science and had received the encouragement of his physician father, Patrick Kerr Rogers. The elder Rogers allowed William and his three brothers to use his library and scientific apparatus as soon as each of them developed an inclination to do so. All four boys received the best education available, both at home and in college, and William soon gained a reputation as a scientific prodigy. Shortly after receiving his degree at William and Mary, he joined the faculty and became a popular and highly respected professor.

During the six-year survey, Rogers and his colleagues literally and figuratively investigated virgin soil. They were the first scientists to identify and name many of the geological formations found within Virginia. They collected large num-

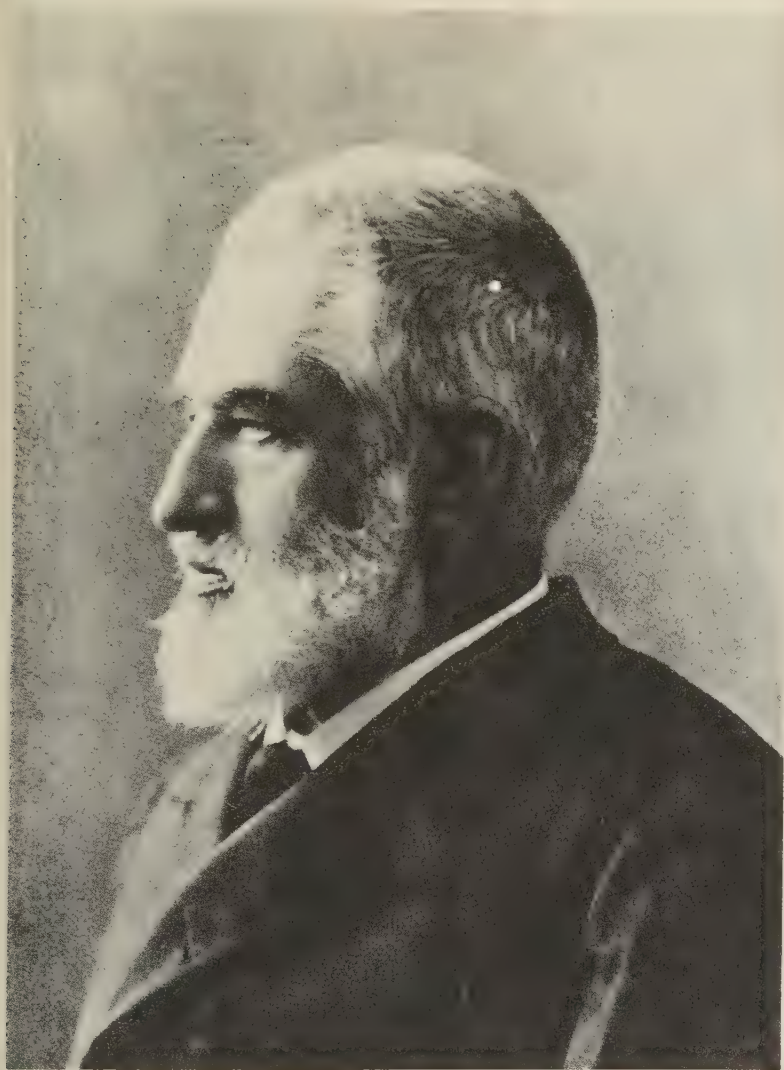
bers of fossil specimens and assembled thousands of maps, sketches, and notes from which Rogers abstracted his annual reports, but the bulk of the survey data was still in rough notes when the project terminated in 1841.

The annual reports that Rogers submitted as state geologist are models of scientific data-gathering and formed the only published text of Virginia geology for more than eighty years. Both his annual reports and his correspondence reveal care, scholarship, sound judgment, and incredible energy. Although the state's small outlay of funds for such vital work constantly plagued him, his reports display little of the frustration he must have felt as other public works projects took precedence over the geological survey. In his final report, submitted on December 30, 1841, Rogers concluded with a plea for more funds to carry on the work. Specifically, he asked that his manuscript map of the state's geological formations be lithographed as a tool for future scientists.

But no more state appropriations were forthcoming, and the project ended—not to be resumed until 1908. In the short period of time that Rogers and his small staff were at work, they had accomplished nearly all of the groundwork necessary for a definitive geological map and a mineralogical museum. But for the next half century, until a later generation of industrialists and engineers rediscovered them, Rogers's reports gathered dust.

After the survey had been canceled, Rogers resumed his teaching career and was appointed professor of natural philosophy at the University of Virginia. In 1853 he accepted a position at the Lowell Institute in Massachusetts. During the next decade, he continued his geological studies, basing much of his system of classifying rock formations on techniques he had developed in the Virginia survey.

Over the years, a number of the most respected geologists



Jedediah Hotchkiss

The individual most responsible for popularizing the work of William Barton Rogers in Virginia was "Major" Jed Hotchkiss, a former Confederate engineer living in Staunton.

The Virginias.

A Mining, Industrial, and Scientific Journal:

Devoted to the Development of Virginia and West Virginia.

Vol. I, No. 1.

Staunton, Virginia, January, 1880.

{ Price 15 Cents.

The Virginias.

PUBLISHED MONTHLY,

By JED. HOTCHKISS, . . . Editor and Proprietor.

AT 1410 E. Main St., Staunton, Va.

TERMS, including postage, per year, in advance, \$1.50. Single numbers, 15 cents. Extra copies \$10. per 100.

Advertising Rates:

One inch, one time, . . . \$1.50 One inch, six months, . . . \$7.50
One inch, two months, . . . 4.00 One inch, nine months, . . . 10.00
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Address all communications to **Jed. Hotchkiss, Staunton, Va.**

Entered as the Postoffice at Staunton, Va., as second-class matter.

For Sale at Hunter & Co.'s Book-store, Main St., Staunton, Va.

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Introductory.

The object of this publication is made known by its title. The development of the resources of the great territory, 67,500 square miles in extent, embraced in the States of Virginia and West Virginia, is the end we have in view. Having spent the life-time of a generation in becoming familiar with the resources, conditions and wants of these States, gathering and accumulating all sorts of information about them, we have been led to the conclusion that there is no other region, of equal extent, in the United States, having so much and such a variety of unmined natural wealth, and that nothing is wanting but a development and utilization of their resources to enable them to rank with, if not lead, the first of the other States in population, industrial activity and accumulated wealth, and to acquire the power derived from the possession of an unlimited store of raw materials with skilled labor and capital to work up and market them. First in importance we place the development of their iron, coal, and a dozen other mineral resources, the extent and richness of which it is even difficult to exaggerate, that done, improvement in all other directions will follow. Therefore ours will be largely a *Mining Journal*, striving to collect and publish full and reliable information concerning the mineral deposits of these States, their location, extent and character, and how they may be made profitable, providing a medium for calling the attention of capital and skill to them, and recording the progress made in this great work. Judging from the various enterprises coming from all directions and from all classes of men, for in

formation of this kind concerning the Virginias, such a journal is greatly needed.

Supplementally, the condition, wants and growth of all other industries in these States will receive attention, especially lumbering, which should be one of prime importance, since they have, untouched, larger and more valuable forest resources than can now be found elsewhere in the Union within the same limits.

The average of unoccupied plantings, growing, and grazing lands, good in quality and varied in location and character, within the Virginias, is larger than can be found within the same bounds of any other region of the United States east of the Mississippi; how to have these occupied will claim our attention.

The basis of substantial material development is scientific knowledge wisely applied, therefore we shall devote a portion of our space to the presentation of scientific facts and statements relating to the Virginias.

We invite communication and correspondence about mineral deposits, the opening and output of mines, the erection and production of furnaces and, generally concerning, and of the resources of Virginia and West Virginia and of progress made in their development. Especially do we ask the Press of these States to aid us by collecting detailed and accurate local information on these subjects and to furnish the information that will enable us to make a full record of what we have and what we are doing.

The success of this undertaking will depend on the substantial encouragement we receive. We are not aware if any way interested on the development of Virginia and West Virginia has been given. We shall do our best to render it worth of their favor.

The American Institute of Mining Engineers, we learn by a circular from Dr. Brown, the Secretary, New York, will hold its annual meeting in New York City, beginning on Tuesday, February 17th, 1880. The local committee of arrangements consists of Messrs. J. A. Borden, A. L. Holley, R. W. . . .

It is a meeting of the Institute of Mining Engineers, held in Staunton, Va. in response to the call of the American Institute of Mining Engineers, and of the Great Valley, and being as they generally and

The New River and Kanawha Coal-fields, of West Virginia, lying along and near the line of the Chesapeake & Ohio Railroad, will be fully treated of in our next number, with especial reference to the location of this important field and to the many beds of excellent coals. This field will be included in this issue, and will attract much attention in consequence of the fact that it is a richly and abundantly contained movement for into it from the Great Kanawha River, and is a rich field of coal. This article was prepared for this issue, but only part of it could have been given. We prefer to give a *General Kanawha Coal Field*, and

The Virginias, vol. 1, no. 1

Through the pages of his monthly "mining, industrial, and scientific journal," Hotchkiss contributed to the economic rehabilitation of Virginia after the Civil War. William Barton Rogers's geological map reached a wide audience when it was issued as a supplement to *The Virginias*. Mining and railroad companies subscribed to the journal, which printed reports on choice coal beds and topographical conditions for constructing roadbeds.

and topographers in America tried to persuade the Virginia legislature to publish Rogers's neglected writings. "Virginia," wrote the astronomer Andrew Ellicott of Baltimore in the 1850s, "is more prolific in valuable minerals than any other state." He pointed out that a geological survey had "cost the State a large sum, and that expenditure is lost and fruitless unless the information be made accessible." Other scientists observed that many of the classifications in common use were named for Pennsylvania formations in comparatively undeveloped areas and were "not applicable to these formations with their grander proportions in the Virginian States."

Modestly, William B. Rogers kept out of the controversy and continued his usual academic pursuits. Between 1860 and 1862 he helped to establish the Massachusetts Institute of Technology and became its first president.

During the Civil War, Rogers remained loyal to his friends in Virginia, and as soon as the war was over, he resumed his correspondence with former associates. His circle of southern admirers soon included a number of former Confederate engineers. Chief among these was "Major" Jed Hotchkiss, who had recently resumed his work as a civil engineer in Staunton. The two men corresponded frequently and exchanged ideas until Rogers's death in 1882.

During the war Hotchkiss had had an opportunity to study Rogers's notes and sketches which were deposited in the state capitol at Richmond. In the 1870s, as his business in Staunton became firmly established, Hotchkiss determined to publish the Rogers geological map at his own expense. In addition to his work as a consulting engineer and geologist, Hotchkiss often invested in and promoted certain mineral lands, and he realized the value of advertising. In the late 1870s he printed several small, cheaply lithographed versions of Rogers's geological map as advertisements, and sent them to potential clients.

Although the maps were successful in attracting prospectors for mining concerns, Hotchkiss was dissatisfied with the quality of the maps themselves. In order to bring Rogers's old notes and data before the public, Hotchkiss decided to expand his publishing enterprises. In January 1880 the first issue of *The Virginias: A Mining, Industrial and Scientific Journal* made its appearance.

The sixth issue of *The Virginias*, published in June 1880, contained a colored supplement (Facsimile 9)—the geological map drawn by Rogers in 1841. Hotchkiss was too much of an entrepreneur to publish the map without a commercial note—the proposed route of the Richmond and Southwestern Railway was superimposed in red over the sheet. Nevertheless, the supplement was well received, and Rogers finally won his deserved niche in the annals of American cartography. Popular recognition for his Virginia maps came to Professor Rogers just a few years before the close of his life. In 1882 he collapsed while handing out diplomas at the M.I.T. commencement exercises and died almost immediately afterward.

After Rogers's death, Hotchkiss continued to publicize the scientist's writings. Eventually, in 1884, the New York publishing house of D. Appleton and Company obtained the rights to reprint in one volume Rogers's annual reports for the years 1835-1841 and a selection of his other articles and unpublished papers. Folded into pockets pasted inside the book covers were lithographed maps and structure sections based on Rogers's manuscripts, including a slightly different version of the geological map published by Hotchkiss. Railroads, mining firms, and lumbering companies competing for choice acreage, were guided by the color bars on the Rogers map and the descriptions in his reports.

The geological map of Virginia is modest in appearance, but it contains more information than first meets the eye. Its topography was based on the 1827 Böye nine-sheet map,

altered to emphasize natural drainage and erosion patterns. The large patches of color representing different formations were the result of Rogers's years in the field—digging, climbing, and analyzing rock strata.

Rogers's color code seems to have been largely his own invention. By indicating the geological structures with colors, rather than with complicated engraved patterns, he was able to present his data in the clearest and simplest manner. His use of color had, ironically, been a major factor in keeping the map from being printed in the 1840s. Since expensive lithographic stones could print only one hue apiece, at least four separate stones would have been needed to apply the red, yellow, blue, and black inks to the map. The sole alternative method was hand coloring. Again, the cost of coloring a large edition would have far exceeded the General Assembly's budget for the geological survey. Although the map's geological data was essentially correct, significant changes had occurred in Virginia's political boundaries between 1841 and 1880: twenty-eight counties, most of them west of the Allegheny Mountains, were created after 1842, and in 1863, Virginia and West Virginia had separated into two states. Before Jed Hotchkiss published the Rogers map, he superimposed these extensive boundary changes over Rogers's framework to bring the printed version up to date.

The coded colors indicate Rogers's theory of the state's geologic formations at a glance. Although the scientific terminology has been greatly refined since the 1840s, the map is still valid today.

The oldest stratum shown was formed during the Earth's infancy, over 600 million years ago. Now designated as the Precambrian era, Rogers called it the "Archaean." On the map its formations are colored gray and are concentrated in the Piedmont area.

The Paleozoic era, when simple life first appeared in the



The USGS Christiansburg Sheet, 1890

Between 1885 and 1887, teams of surveyors and geographers began working in Virginia to compile the base maps for the USGS topographical survey of the United States. In 1882 other teams had inaugurated the project in the far West. The first quadrangle of an area in Virginia was the Christiansburg Sheet, published in 1890, drawn to a scale of 1:125,000. Since 1965 the same area has been completely remapped to a scale of 1:24,000. Sixteen new maps are required to cover the area of the 1890 sheet.

oceans, spanned a time from about 600 million to 270 million years ago. This era and its periods were most important to Rogers and Hotchkiss since the great coal beds of Appalachia were formed then. Rogers distinguished the periods of this era as follows: the Cambrian and Lower Silurian periods (blue-green), the Upper Silurian period (orange), the Devonian period (yellow-orange), the Mississippian period, or "Lowest Coal Group" (white), the Pennsylvanian, or "Carboniferous Limestone Group" (medium-pink), and the Permian period, or "Great Coal Group" (tan). These areas include the Virginias west of the Blue Ridge.

The Mesozoic era, which lasted from about 270 million to 70 million years ago, is often called the "age of dinosaurs." On the map its periods are indicated as follows: the Triassic and Lower Jurassic (dark pink), and the Upper Jurassic and Cretaceous (light pink). The formations of this era are scattered in the Piedmont and along the fall line.

The present Cenozoic era—the "age of mammals"—which began about 70 million years ago, is shown by the Tertiary and Quaternary periods (yellow), which cover Virginia east of the fall line.

Roughly coincidental with Hotchkiss's publication of the Virginia geological map, the United States government decided to consolidate several small federal agencies that had been responsible for geological and topographical mapping. The United States Geological Survey (usually abbreviated as USGS) was established by Congress on March 3, 1879, under the directorship of Clarence King. Its task was to map the entire United States on a series of uniform, accurate topographic sheets, each one covering a small area. Since nothing of this nature had been attempted before, the USGS was compelled to develop its own guidelines and methods. Under King and his successor, John Wesley Powell, the now-familiar "topographic quadrangles" evolved.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
TWISDALL BUILDING

GEOLOGIC ATLAS

OF THE
UNITED STATES

HARPERS FERRY FOLIO
VIRGINIA - MARYLAND - WEST VIRGINIA

INDEX MAP



AREA OF THE HARPERS FERRY FOLIO

AREA OF THE HARPERS FERRY FOLIO

LIST OF SHEETS

DESCRIPTION TOPOGRAPHY AREAL GEOLOGY ECONOMIC GEOLOGY STRUCTURE SECTIONS

FOLIO 10

LIBRARY EDITION

HARPERS FERRY

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The USGS Harpers Ferry Folio, 1894

Besides publishing individual quadrangle maps, the USGS also issued a series of geological "folios" consisting of two to six maps bound into paper wrappers. The first map in each folio was the standard quadrangle of a given area, followed by one or more sheets covering the areal geology, structure, and columnar sections of the same area. The maps were accompanied by a written text explaining the geology and mineral deposits. By 1906 the project had been cancelled for lack of funds, and only the individual quadrangles were published.

As conceived by Powell, each quadrangle, covering one-fourth of one degree of latitude and longitude (or 15'), was to be accompanied by a geologic "folio." The folio would consist of a base map, a geological report of the area, and a series of maps illustrating economic and areal geology and structure sections. In their symbols and use of colors to distinguish the separate strata, the folios incorporated some of the techniques that Rogers had devised. Publication of the folios came to an end in 1906 for lack of funds, but the USGS has continued to issue individual topographic quadrangles. During World War II, it began to make more highly detailed quadrangles: the sheets depicted on 7.5' rather than 15', of latitude and longitude.

In 1908 Virginia organized its second geological survey, to continue the work begun by Rogers nearly seventy years earlier. The General Assembly appointed Dr. Thomas Leonard Watson and a large state commission, headed by the governor, to expand the existing knowledge of Virginia geology. Because the USGS was attempting to map forty-six states on a limited budget, the work was expected to take years to complete. As a result, the commonwealth decided to carry on its own investigations, motivated by the desire to exploit mineral beds, rock quarries, and sources of hydroelectric power.

To accomplish these aims, the legislature proposed a "matching-funds" plan whereby the state and the federal government would each pay half the expenses. The commission had full power to "accept or reject" any assistance or data offered by the USGS.

By the time of Watson's death in 1924, the commission had produced twenty-six volumes of reports and schematic diagrams. Equally important, it had also published the first "official" geological map of Virginia, drawn to a scale of eight miles to the inch and utilizing the color codes pioneered by William Barton Rogers.

Unlike the Rogers map, the 1911 Virginia geological map was based on the projections and base maps of the USGS. As a result, it was more astronomically correct than was Rogers's work, which was based on the Böye nine-sheet map of 1826. The USGS had adopted a "polyconic" projection, which transferred spherical coordinates to a series of flattened "cones," the bases of which correspond to parallels of latitude. This projection is more versatile and is better suited to a nation that spans a continent, since lateral distortion is kept to a minimum.

From 1911 to the present, Virginia's geological formations have been studied by numerous state and federal institutions. The Virginia Polytechnic Institute and State University in Blacksburg, the Virginia Division of Mineral Resources, the USGS, the United States Department of Agriculture, and the United States Department of the Interior are a few of the agencies that have worked to map, preserve, and develop Virginia's scenic and economic resources. Geological investigation is the first step in undertaking activities as diverse as house construction and flood prevention. Every work of man that alters the face of the land has profound effects on geological and ecological systems. Rogers's reports described Virginia's mineral wealth for the purpose of exploitation, but today's geological investigators must act the part of conservationists if man is to enjoy the benefits of the Earth's resources in the future.

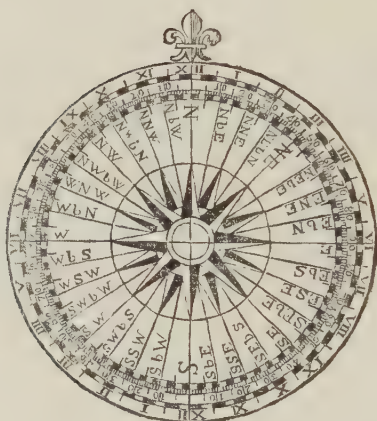
The story of Virginia cartography does not end with the publication of William Barton Rogers's geological map in 1881, nor does it end with the thousands of maps constructed since then. The nine maps reproduced in facsimile may be considered the first faltering steps in a journey whose destination is not yet in sight. As Alvin Toffler has pointed out in *Future Shock*, more technological advancement has been made in the decades since 1900 than in the millenia before that date.

Scientific cartography is no exception. Until the introduction of the airplane, high-speed photographic film, telemetry, radar, sonar, and other twentieth-century inventions, mapmaking remained in its infancy. This fact does not mean that the cartographers working before 1900 were less careful, artistic, or scientific than their modern counterparts—in many cases the reverse is true. Today's mapmakers are greatly indebted to pioneers like Ptolemy, Mercator, Smith, and Rogers for the basic concepts and methods of their craft. As in other fields of endeavor, mapmaking has become a team effort instead of the work of a single individual. The simplest road map is the product of many surveyors, geologists, pilots, mathematicians, astronomers, draftsmen, and lithographers, each contributing a necessary skill.

At the present writing, all of Virginia has been mapped by the USGS and most of the older 15' quadrangles have been remapped in the 7.5' series. Due to the rapid growth of suburban developments and industrial areas, these maps are being revised constantly by "photogrammetric" methods. Through aerial photography, overlays can be made for each quadrangle to keep pace with proliferating man-made changes without laboriously resurveying entire areas.

What of the future? The trend of cartography during the last three hundred years has been towards greater accuracy in representing surface features. An increasing number of classroom maps prepared since World War II are actually photographs of three-dimensional models, shaded and colored to imitate topography. Alternatively, some cartographic firms have used thin plastics to produce inexpensive three-dimensional maps for a mass market. The Virginia Department of Highways and the United States Department of Agriculture regularly prepare "mosaics" of each county, made from hundreds of overlapping aerial photographs. Traditional maps printed on paper are being supplemented by photographs and

three-dimensional models. In the next few years, other means of transmitting geographical data may be discovered, but the more familiar styles of maps will probably be around as long as people travel over the Earth's surface.



APPENDIX

Notes on the Tables and Directions

Given in Facsimile 4

The "Carte de la Baie de Chesapeake," published in 1778 by order of Antoine Raymond de Sartine, Minister and Secretary of State for the French Royal Navy, contains many useful and curious sailing directions and tabular data, based on earlier notes by Walter Hoxton and Anthony Smith. Since the French translation is an idiomatic rendering of the earlier text, Hoxton and Smith's notes are given below as they appear on the 1735 and 1776 charts.

WALTER HOXTON, 1735

In this Draught all the Principal Points, and all the Shoals and Soundings are Exactly Laid Down, but as I have not had Oppertunity to Survey all the Bays, Rivers and Creeks, I have distinguisht what is my own doing by a Shading within the Line, from the other part of the Coast which to make this Map as compleat as at present I am able, have borrow'd from the Old Map, & are Traced by a Single Line without Shading.

N.B. The Depths of Water are Set down in Fathoms as farr up as Spes Utie Island, but above that in Feet.

An Attempt towards Ascertaining the Limits Course & Strength of the *North East Current* on the Coast of VIRGINIA.

It is Generally known by those who Trade to the Northern parts of America, that the Current which comes out of the Gulph of Florida, runs constantly along the Coast of Carolina and Virginia, and considerably further to the Northward, varying its Course as it is Obstructed by the Shores.

Now if the said Current always runs nearly in the same part or space of the Ocean, (as from a great Number of Tryals and Observations which I have made in 23 Voyages to Maryland, I have

reason to think it does) the knowledge of its Limits Course and Strength, may be very useful to those who have occasion to Sail in it as

1st. Those who are bound to the Northward may make use of it to their advantage, and those bound to the Southward may know how to avoid it, and for want of this knowledge many ships bound to Virginia have been driven to the Northward of the Capes contrary to Expectation, and so lost the benefit of a Southerly Wind which might have carried them in.

2d. When by Observations of the Latitude or Tryal in your Boat you find you are in the Current, the Part of the Ocean It runs in, and your Latitude being known, you may judge pretty nearly your distance from the Land. In the Current are strong Riplings, & if the Wind blows between the N°. & E^t. it make a very Irregular & Dangerous Sea.

Underneath I have sett down the Eastern & Western Limits or bounds of the said Current from Lat.^d 35°.00' N°. to Lat. 37°. 30' N°. according to my Observations, which it may not be amiss to Prick down in your General Charts, and draw the bounding Lines, and altho I may probably Err a few Leagues, yet I doubt not but it will be of service to my Brother Mariners, (especially to those who are Strangers to this Coast) and by their further Observations its Limitts may perhaps hereafter be more exactly known.

Lat. ^d N°.	Western Limits	Eastern Limits	Breadth of the Current
	Diff. ^r Longitude from Cape Henry	Diff. ^r of Longitude from Cape Henry	East & West Degrees of Longitude
35: 00	1: 20 E ^t .	3: 00	1:40
35: 30	2: 09	3: 50	1:41
36: 00	3: 10	5: 10	2:00
36: 30	3: 50	5: 50	2:00
37: 00	4: 30	6: 30	2:00
37: 30	5: 10	7: 17	2:07

The Current settts in the above Latitudes N°. E^t. (variation allow'd) about 32 Miles in 24 hours but in Lat.^d 38°: 00' N°. it turns off more Easterly. There is no Current between the N°.E^t.

Current and the Soundings, but in the Soundings is a Southern One which runs Generally about half a Mile per Hour, tho Sometimes Stronger.

Also to the Eastward of the N.E. Current there is a Southern Current of about half a Mile per hour, and much broader than the N°. East Current.

The Plate not being large enough to contain all the Soundings I have underneath set down the Depths of Water along the Outer Edge of the Bank, which is the farthest from the Land that we have Soundings the Banks being very steep.

Lat^d. 36°: 28 N°. distance from the Land 20 Leagues is 45 Fath.

36 : 40 ————— 20 ————— 32

36 : 52 ————— 20 ————— 80

36 : 55 ————— 18½ ————— 35

37 : 08 dis^e. from Cape Henry ——— 26½ ——— 30

Directions for Sailing between the Middle Ground & Horse Shoe

Cape Henry SE by S by Compas or SE 1/2S by the Draught, leads over the Tail of the Horse Shoe in 5 & 6 fathoms. this part of the Shoal lyes in Ridges, so that you will frequently find a fathom difference at a Cast: but it is not Dangerous. The Tyde of Ebb down Chesepeack Bay, settts over it to the Southward.

The Middle Ground is a very hard sand and pretty Steep, and the Ebb out of James and York River settts over it to the Eastward, which makes it dangerous Sailing here in the Night. In Turning, Stand towards the Horse Shoe to 4 or 5 fathoms, and towards the Middle to 8 fathoms but 'tis best not to venture into deeper Water, for the deepest Water viz^t. 9 & 10 fathoms, is very near the said Shoal.

Directions for Sailing into James River

Point Comfort is chiefly covered with Woods, but there are two places on it where no trees grow; which makes it appear like two

Islands. The leading Mark, is a Windmill over the middle of the North most opening, which will carry you by the Shoal of Willoughby's point, in 7 or 8 fathoms. If you turn in, Stand no nigher the said Shoal than this, then you may stand to the Northward cross the Channel, where is 14 or 15 fathoms, & Untill it Shoalens to 10 on the Horseshoe side, then the Mill will be shut in, and you'll see a large house in the midst of the said opening, as in the Draught here the Horseshoe is very steep, and a Strong Tyde runns. The Ebb setts over the said Shoal out of James River.

Directions for Sailing from Love Point into Potapsco River

When a little above Love point borrow or the Western Side of the Bay to 5 fathoms, but if you keep in 4 fathoms you will fall upon the Knowls which lye off Bodkin Point and if you goe into 9 or 10 fathoms you'll be near the Shoals of Swan Island. runn up the Bay in the Said depth until a Gapp in the Woods on Sparrows point comes within a Small Sails breadth of North Point (as in the Draught) which will lead you between the Shoals in the best of the Channell, where is about 3 Fathoms Water & Soft Ground. keep the Marks on untill the Bodkin Point bears S.S.W. then Steer W. or W. by N. into the River, giving North point a birth of about a Mile. When abreast of North point, Steer for the White Rocks, untill you bring Leading point which is pretty high Bluff Woods within two Sails breadth of Hawkins's point, and so keep it untill you are almost abreast of the Rocks, then Edge to the Southward till you bring the said Points within a small Sails breadth of Each other, which will lead you up to Hawkins's point, to which give a birth of a quarter of a Mile. there are Several Small Knowls of 2 fathoms on each Side of the Channell which are Steep too, and the Channell between them not above $1/4$ of a Mile wide.

HERRING BAY

Variation 5° Westerly, The depth of Water is set down in Feet.

Leading mark to come round the End of the Middle Ground is this House midway between Mr. Chew's Junr. and the Great Tree. In turning you may bring it within a Sails Breadth of the Tree, & within the same distance of Mr. Chew junr. House.

ANTHONY SMITH, 1776
(*Additions to Hoxton's notes only*)
To Sail over the Horse Shoe.

Bring Willoughby's Cliff which is the Westernmost Sand Hill, to bear S.W. by S. $1\frac{1}{2}$ S. and Steer over N.E. or bring Crumps Hill, which is the Highest of the Sand Hills, and the only one which is as High as the Tops of the Trees, to bear S. and Steer over N. Either of these Marks will carry you over in 3 Fathoms.

[CEDAR POINT]

A House just open of the Point leads clear. It is Difficult to distinguish the House which is the proper Mark, there being several Tobacco Houses by it. It is the Westernmost of Three which stand together, and has a Chimney upon it. a little further up are 3 or 4, one of which has two Chimneys, is Red, has windows, and is called the Office House.

N.B. Above Wicocomaco River, there are many Shoals called Kettle bottoms: none of the Pilots Know exactly where they Lie, but in going up, their Rule is to Steer from Clements Island for Sandy Point, and Keep the Sounding upon the Virginia Shore till they open the Narrows of Cedar Point. And in coming down to Keep the Virginia Shore on board till Length of Sandy Point.

OBSERVATIONS IN THE RIVER PATOWMACK,
BY AN OFFICER IN THE NAVY

In Sailing up the Patowmack, I followed as near as possible the Track mark'd in this Draught, by the Printed Figures of the Depth of Water along the Dotted Line, which I found to be very correct, and in coming down I have mark'd the Depths we found in Places where it was not mark'd before. I have Likewise mark'd the Courses down each Reach, and I estimated the Distances, from place to place, as follows

		Miles
from Alexandria To	1	9
	2	6
	3	5
	4	7
See the figures on the Points of Land along Patowmack	5	6
	6	3
	7	6
	8	4
	9	4
	10	7
	11	4
	12	4
	13	8
	14	6
	15	8
	16	18
	17	24
	18	7 Point Lookout

At most it is only

136 Miles from Alexandria to Point Lookout, though the Pilots call it 180.

The Tides in Patowmack River are not very Strong, except after great Rains the Ebb is pretty Strong, then there is little or no Flood: and there is never above 4 or 5 Hours Flood, except with Long Strong Southerly Winds. In Ordinary Tides it Flows about Four Feet.

It is Observed that with Northerly Winds and moderate Weather, the Wind usually Follows you down each Reach, and in like manner, when it is in the Southern Board it inclines up the Reaches.

These & all other Remarks, Additions or Alterations which I have made, were done upon the Spot, and with the Assistance of My Pilot Anthony Smith of St. Marys.

The Double Lines ===== mark the Ferries.

Patowmack River is Navigable with large Shipping to Alexandria, & for shallops as high as the Falls.

Choptank is Navigable with shallops to the Bridge, about 7 Miles within Delaware Colony.

BIBLIOGRAPHICAL ESSAY

The subject of historical cartography is almost as old as maps themselves. Ancient rulers collected maps of their own domains and of neighboring countries, sometimes amassing libraries that ran to thousands of specimens. By the middle of the sixteenth century, maps of the "new-found" land of America began to dominate European collections by reason of their extreme novelty. Eighteenth-century Americans venerated the maps of a century earlier, and many a wealthy Virginian's estate inventory included one or more "parcells" of maps and atlases. The better-known atlases by Theodor de Bry, John Ogilvy, and the Amsterdam geographers Henry Hondius, Wilhelm Jantsoon Blaeu, and J. B. Homann, were highly prized by the descendants of the "auncient planters" of Virginia.

Most of the significant maps of the New World have been admirably reproduced in W. P. Cumming, R. A. Skelton, and D. B. Quinn, *The Discovery of North America* (New York: American Heritage Press, 1972). Also valuable, both for its text and its illustrations, is Leo Bagrow and R. A. Skelton, *History of Cartography* (Cambridge, Mass.: Harvard University Press, 1964). For a serious student of Renaissance exploration, navigation, and cartographic science, D. W. Waters's *The Art of Navigation* (New Haven: Yale University Press, 1958), and Eva G. R. Taylor's *Late Tudor and Early Stuart Geography, 1583-1650* (London: Methuen & Co., 1934), are highly recommended.

Younger readers, or those with merely a passing interest in maps, will enjoy Stefan Lorant's *The New World* (New York: Duell, Sloane & Pearce, 1965), Lloyd A. Brown's *The Story of Maps* (Boston: Little, Brown & Co., 1949), and David Greenwood's *Down to Earth: Mapping for Everybody* (New York: Holiday House, 1944). The standard work on cartography as an exact science is Arthur H. Robinson, *Elements of Cartography* (New York: John H. Wiley, 1960).

Virginia cartography has been a somewhat neglected field for the past few decades. The two classics in the subject were both

published before World War I and have never been superseded. These are P. Lee Phillips's *Virginia Cartography* (Washington, D.C.: The Smithsonian Institution, 1896), a short and concise monograph covering only the most important specimens, and Earl Gregg Swem, ed., *Maps Relating to Virginia in the Virginia State Library and Other Departments of the Commonwealth*, published as *Bulletin of the Virginia State Library*, vol. VII, 1914. Swem's catalogue lists well over three thousand separate maps published or drawn between 1590 and 1914.

In addition to his monograph, Phillips published a short article entitled "Some Early Maps of Virginia and the makers, Including Plates Relating to the First Settlement of Jamestown" in the *Virginia Magazine of History and Biography*, XV (July 1907), 71-81. A more recent and extensive article in the same journal (LVIII [January 1950], 3-15), is Coolie Verner, "The First Maps of Virginia, 1590-1693."

Captain John Smith's life and activities have been treated in hundreds of volumes. The standard edition of his own writings is Edward Arber, ed., *Travels and Works of Captain John Smith*, 2 vols. (Edinburgh: John Grant, 1910). One of the best narrative biographies of Smith is Philip L. Barbour's *The Three Worlds of Captain John Smith* (Boston: Houghton, Mifflin, 1964). The maps of Smith and his contemporaries are discussed in Alexander Brown's classic *Genesis of the United States*, 2 vols. (Boston: Houghton, Mifflin, 1890). A recent monograph on Smith's map is Dr. Ben C. McCary's *John Smith's Map of Virginia*, Jamestown 350th Anniversary Historical Booklet no. 3 (Richmond, 1957). An excellent facsimile of Theodor de Bry's engravings from John White's Indian watercolors, available at a modest price, is Thomas Harriot, *A Briefe and True Report of the New Found Land of Virginia* (1590), reprinted by the Dover Press in 1972. Plates III, XXI, and XXII of this work were the basis for William Hole's vignettes on Smith's map.

Augustine Herrman, best known for his map of 1673, is the subject of a short biography by one of his descendants. Earl L. W. Heck's *Augustine Herrman* (Englewood, Ohio, 1941) covers the highlights of his career in Holland, New Amsterdam, and Maryland. Herrman's "Journal of an Embassy to Maryland in 1659" is reprinted in Clayton C. Hall, ed., *Narratives of Early Maryland*

(New York: Scribner's, 1910). A color facsimile of a contemporary painted vellum manuscript copy of Herrman's map may be found in William Blathwayte, *The Blathwayte Atlas* (Providence, R.I.: Brown University Press, 1970). Some of the adaptations and piracies of Herrman's map are illustrated in *The World Encompassed*, a catalogue published by the Walters Art Gallery, Baltimore, Maryland, in 1952. John Senex is known largely through his maps, many of which are now in American libraries and private collections. The advertisement for his matched globes of 1708 appears in Edmund Halley, *Miscellanea Curiosa*, 3 vols. (London, 1708).

As of this writing Joshua Fry and Peter Jefferson have not been the subject of any exhaustive biographical study. The most recent treatment of their lives and cartographic endeavors is Dumas Malone, *The Fry & Jefferson Map of Virginia and Maryland* (Charlottesville: University Press of Virginia, 1966), a short guidebook designed to accompany two facsimiles of their map. William P. Cumming deals briefly with the Fry-Jefferson map in *The Southeast in Early Maps* (Princeton, N.J.: Princeton University Press, 1958). A study of Virginia county formations is found in Morgan P. Robinson, *Virginia Counties: Those Resulting from Virginia Legislation*, published as *Bulletin of the Virginia State Library*, vol. IX, 1916. Lewis Evans's contributions to American geography during this period are covered in Lawrence Henry Gipson, *Lewis Evans* (Philadelphia: The Historical Society of Pennsylvania, 1939), and in Thomas Pownall, *A Topographical Description of the Dominions of the United States of America* (Pittsburgh: University of Pittsburgh Press, 1949). Pownall's work first appeared in 1776 and was based on Evans's earlier studies.

The Hoxton-Smith-Sartine maps of Chesapeake Bay are ably discussed in Arthur Pierce Middleton's *Tobacco Coast: A Maritime History of Chesapeake Bay in the Colonial Era* (Newport News, Va.: The Mariners Museum, 1953). The Sartine map of 1778 is reproduced in a recent publication of the Naval History Division, Department of the Navy: W. Bart Greenwood, ed., *The American Revolution, 1775-1783* (Washington, D.C., 1972). This portfolio and gazetteer acts as a supplement to the massive *Naval Documents of the American Revolution*, a continuing publication of the United States government.

The period represented by Thomas Kitchin's map of 1783 is the subject of hundreds of volumes. Two of the more pertinent works are Thomas Perkins Abernethy's *Western Lands and the American Revolution* (New York: Russell and Russell, 1959), and his *Three Virginia Frontiers* (Baton Rouge, La.: Louisiana State University Press, 1940). William H. English's classic *Conquest of the Northwest*, 2 vols. (Indianapolis, 1896), is a good source book for George Rogers Clark's frontier activities.

It is unfortunate that the three men whose work culminated in the nine-sheet maps of 1827 and 1859 left little to posterity other than these monumental specimens of cartography. John Wood is the only one to be awarded space in biographical dictionaries, but this honor is due to his political writings and not to his maps. Hermann Böye remains a shadowy figure who appeared briefly on the stage of history and then vanished. A brief sketch of Ludwig von Bucholtz may be found in Herrmann Shurricht, *History of the German Element in Virginia* (Baltimore, 1898). The Philadelphia engravers who transferred the map to metal plates are catalogued in David M. Stauffer, *American Engravers upon Copper and Steel*, 2 vols. (New York: The Grolier Club, 1907). A large body of manuscript correspondence concerning these maps is in the collections of the Archives Division, Virginia State Library, filed as "Executive Department, Executive Papers, 1817-1859" and "General Assembly, Executive Communications, 1825-1827." The printed journals of the Virginia House of Delegates for the same date range contain further references. The printed documents bound with the early journals are indexed in Earl G. Swem, ed., *A Bibliography of Virginia*, part II, in *Bulletin of the Virginia State Library*, vol. X, nos. 1-4, 1917. Also in the Archives Division is a series of manuscript "Compiled State Contracts, 1816-1865," containing John Wood's and Hermann Böye's agreements with the commonwealth. A separate box of contracts with county surveyors, 1816-1817, sheds further light on the first attempt at a state-sponsored map.

Claudius Crozet, the engineering genius who assumed the responsibility for mapping Virginia from 1839 through the 1850s, is the subject of a sympathetic biography by Colonel William Couper, entitled *Claudius Crozet: Soldier-Scholar-Educator-Engineer (1789-1864)*, published in Charlottesville in 1936. Couper's

other well-known book, *One Hundred Years at VMI*, 4 vols. (Richmond, 1939), deals largely with Crozet's varied abilities. Like the nine-sheet map, the internal improvements series is covered by a wealth of manuscript material in the Archives Division, Virginia State Library. Besides the Executive Papers and Executive Communications cited above, the papers of the Virginia Board of Public Works contain much valuable information.

The rapid developments in cartography during the Civil War remain a fertile area for modern historians. The National Archives and Records Service publishes a guide to *Civil War Maps in the National Archives* (Washington, D.C., 1964), and the Library of Congress has prepared a catalogue of *The Hotchkiss Map Collection* (Washington, D.C., 1951). The largest source of Civil War maps is the *Atlas to Accompany the War of The Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington, D.C., 1880-1901), 70 vols. in 127, and Index.

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